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ABSTRACT

A project to propose a system for managing curriculum improvement at the state level (1) identified the basic functions necessary for a statewide curriculum management effort, (2) explained the supporting activities required to initiate and maintain its operation, and (3) developed a model system for curriculum management. The five functions identified as forming the basis of a curriculum management system (CMS) model were management, development, reproduction, diffusion/dissemination, and evaluation/revision. Management of curriculum was to be based on the management functions of planning, organizing, implementing, controlling, and evaluating. A CMS model was designed which flowed from the overall master plan for vocational education. Input from various components of vocational education was then organized, analyzed, and prioritized. Phase 1 involved activities concerned with identifying programs requiring improvement based on needs assessments. Acquiring the needed materials in phase 2 could follow three subroutines: revising the existing materials, procuring materials from other sources, or developing new materials. Phase 3 continued the process of material development: developer selection, pilot and field testing, and diffusion. Formative and summative evaluation of CMS were recommended for phase 4: revision should follow. (Fourteen information sheets are provided throughout the document. Sample materials are appended.) (YLB)

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The Development and Testing of a Statewide Multilevel Curriculum Management System for Georgia Vocational Education Programs

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A

MODEL

STATE LEVEL

CURRICULUM MANAGEMENT

SYSTEM

Paul Scott
Bruce Simpson
Ray Butler

Preface

The development of this model state level curriculum management system is the outgrowth of a basic movement by vocational educators to improve the quality of curriculum materials available to vocational programs. The serious nature of this movement is evidenced by the specific inclusion of curriculum development in both the Vocational Education Amendments of 1968 (PL 90-576) and the Education Amendments of 1976 (PL 94-482; Title II); the creation of a National Network for Curriculum Coordination by the U.S. Office of Education; and the establishment of curriculum units and materials centers by the state department of education vocational education bureaus in numerous states.

Limited formal work has been done in the area of curriculum management as a state level function. In preparing for this project the authors were able to find only two journal articles actually discussing curriculum management from a statewide perspective. One of these articles was based on the functions of the senior author's curriculum unit in the Georgia Department of Education. The other was prepared as a generic approach to curriculum management. To obtain sufficient information, the current activities of four state curriculum coordinating units were investigated. A review was made of the current processes used by the Georgia curriculum coordinating unit, an on site visit was made to the State Department of Education in Florida and to the curriculum center at Florida State University; papers from the North Dakota curriculum unit were reviewed; and proposals, papers, contracts and other documents from the USOE regional center for the National Curriculum Network at Mississippi State University were analyzed.

From this information the authors formed the working model for the state level curriculum management system described in the remainder of this manuscript. This model provides an organized system for curriculum management while leaving each state that may choose to implement it the flexibility to define and adjust the various components to suit its peculiar needs.

Paul Scott
February 20, 1979

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Paul Scott
Bruce Simpson
Ray Butler

Introduction

Rationale for Applied Curriculum Management

For many years, state departments of education have assumed the role of regulatory agencies. However, recent national trends have indicated that vocational education divisions within state departments of education are moving toward a leadership role, as opposed to the former regulatory position. These bureaus are now concentrating on program improvement at the grassroots (classroom) level, and many states have already formed special units to provide the leadership for their concentration on improvement. Many of these units, however, are currently operating on a management-by-crisis basis, or through a project-by-project arrangement, stemming from a lack of long-range planning and a systematic approach to educational improvement.

The purpose of this document is to propose a system for managing curriculum improvement at the state level. The paper will address this purpose in three steps.

The first step will be to identify the basic functions necessary for a statewide curriculum management effort. These functions will be used to establish the framework for a model curriculum management system (CMS).

The second step will address the supporting activities required to initiate the operation and maintenance of such a system. These activities will be explained using the general management functions of planning, organizing (including staffing as a sub-function), implementing, controlling, and evaluating. The third step will introduce a proposed model system for state level curriculum management.

Functional Basis for the CMS

Vocational education as a whole succeeds or fails on the basis of quality instruction. Research has not yet fully developed all of the contributors to quality instruction. However, one obvious contributor to successful teaching/learning is well-developed, conceptually sound curriculum materials. Such materials do not generate themselves. Provisions must be made for the planning, implementing and evaluating of these materials. To accomplish this, a leadership commit ment from state departments of education must be established before the development of an operational state level curriculum management system.

The curriculum coordinating center at Mississippi State University has introduced five generic curriculum management functions. These functions are: management, development, reproduction, diffusion/dissemination and evaluation/revision (Wall, 1972). In a presentation to the National Network for Curriculum Coordinators, Scott (1976) identified subordinate tasks for each of these functions. From these functions and subordinate tasks this model state level curriculum management system has been prepared.

Overview of the Framework for a CMS Model

The model should be developed around five basic functions (management, development, reproduction, diffusion/dissemination and evaluation/revision). The duties and tasks that complete these functions will form the basic framework for the model. A description of each function follows.

The Management Function

Curriculum planning is a functional part of the overall statewide planning system for vocational education. Therefore, it must be judiciously related to the state's master plan for vocational education. Curriculum, however, is a critical element in the master plan and as such will require specific attention and care. This indicates that the planning and development of curriculum needs governance, which governance should be a component part of the office of the State Director of Vocational Education and should include the accepted management activities of organizing, planning, implementing, controlling and evaluating. The following duties and tasks are designed to fulfill the state level curriculum management function:

I. Establish operational policies and procedures for the system.

II. Appoint curriculum coordinating committees from local vocational educators, vocational teacher educators, state department service area staff and business/industry.

III. Designate an executive council to function as the official decision-making body of vocational curriculum development activities.

IV. Assign a curriculum staff to provide leadership and the administrative activities necessary to maintain the system.

V. Perform needs assessments.

VI. Determine priorities.

VII. Develop a budgeting procedure.

The Development Function

The development function follows the sequential decisions made during the management function relative to defining needs, establishing priorities of the identified needs and budgeting the priorities. It includes not only the actual development of curriculum materials but also procuring

materials from other sources, modifying them if necessary and testing their utility/effectiveness. The following management tasks will be required to implement this function:

I. Develop and publish specifications.

II. Initiate developmental projects either through annual plan funding or grants and contracts.

III. Provide procedures for project monitoring.

The Reproduction Function

The very best materials will be of little value if they are not reproduced in sufficient quantities to reach teachers and students. Therefore, some economically feasible process that will reproduce the material in both quality and quantity format must be identified and utilized. The alternatives for reproduction include private publishers, commercial printers, and state department or university materials centers. Many states are now using state department or university materials for this purpose are doing so for three basic reasons: 1) some costs can be recovered through this process; 2) the small quantities of materials required are not profitable to commercial publishers; and 3) good vocational materials require frequent updating and adjusting making their reproduction even more unprofitable. An organized materials center(s) will have the capacity to make these changes as they are needed.

The Diffusion/Dissemination Function

The goal of this function is to place the materials produced through the curriculum management system into use in the classroom, laboratories, and shops of vocational educational programs. This function requires a strict emphasis on staff development as a precursor to installing new curricular materials in a given vocational education program. It also requires an organized plan to provide the new materials to the teacher in sufficient quantity to make the installation a reality.

The Evaluation/Revision Function

The interrelated functions of evaluation and revision must focus on both the curriculum materials being developed and the utility of the curriculum management system itself. In addition to the initial evaluation/revision cycle of the system, the evaluation/revision process should continue over the life of the system. Because of the dynamic nature of the model curriculum management system, the following components should be analyzed independently and collectively as a part of the evaluation/revision cycle of the CMS:

1. Procedures and guidelines
2. Communication/coordination between individuals, units, or groups
3. Effectiveness of decision making units
4. Clarity of assignment of responsibilities
5. Appropriate scheduling of materials development and field test
6. Proper functioning of the diffusion system
7. Proper functioning of the dissemination system

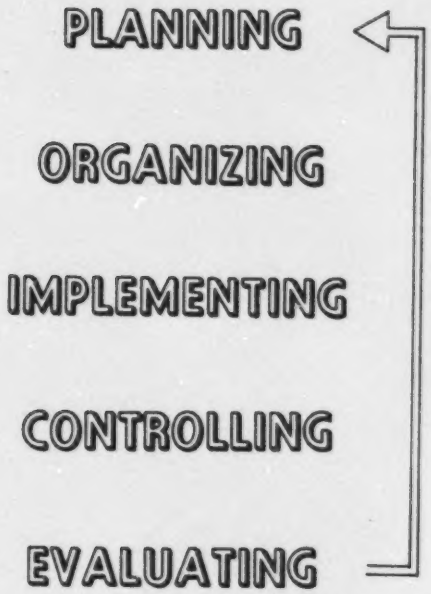
A systems evaluation/revision based on the above components would, therefore, include a summary of the activities, products, and objectives of each phase and would answer the question, "Did all phases of the system function according to plan?"

A materials evaluation/revision would analyze:

1. Objectives
2. Learning activities
3. Student resource materials
4. The field test site
5. Criterion referenced tests
6. Performance (skill) tests

The materials evaluation/revision would also ask the question, "Is the developmental process on schedule?"

THE MANAGEMENT PLAN FOR THE CMS



The Management Plan for the CMS

As previously stated, curriculum, as a critical element in the master plan for vocational education, requires specific attention and care. To accomplish this, management of curriculum should be a component part of the state vocational education director's office and should be based on the management functions of planning, organizing, implementing, controlling and evaluating. Each of these functions requires the assignment of specific duties and tasks relative to the management of curriculum within the CMS.

With respect to the CMS, the planning function includes by definition the specification of all necessary considerations and components required to prepare the system for implementation. Planning for the CMS includes, among other things, establishing for the system a mission which must be coordinated with the master plan for vocational education. In addition, planning for the system should identify the human and fiscal resources necessary to operate and maintain the system. Sufficient time must be provided for the planning function to establish the system or the entire operation will never become stabilized.

Organizing the system will include establishing both the specification of tasks assigned to each position, committee, or council and the delegation of the authority necessary to carry out the assigned tasks. In addition, the authority relationships are specified (the chain of command) to clarify reporting relationships. The organizing function includes staffing and the assignment of personnel qualified to assist in attaining the objectives and goals of the system. Organizing the system will include:

I. Developing an executive council to oversee the curriculum effort.

II. Appointing curriculum committees by instructional area to determine existing deficits and needs, and to assist in establishing criteria for replacement curricular materials.

III. Establishing a curriculum unit with appropriate staff (or defining staff needs).

IV. Developing policies and procedures for the curriculum management system.

V. Preparing and training key personnel.

VI. Installing the system model.

VII. Piloting the model.

With the planning of the system complete, and the organizing and staffing developed, the next consideration is that of implementing the system. Once the decision to implement the system has been made, the following activities must be considered:

I. Activating input procedures for the model.

II. Prioritizing needs and proceeding as described.

Crucial to the implementation of the system is effective staffing and staff development, as discussed under organizing. A well-prepared and organized staff will effectively ensure successful implementation of the system. Of at least equal if not greater importance to successful implementation is the need for support from the State Director of Vocational Education. Without the Director's decision to implement and support implementing a curriculum management system is an impossibility. In addition, the decision makers and curriculum staff must be aware of the people within the organization who hold leadership positions (opinion leaders as well as titled leaders) and must gain the support of those key people who are critical to the acceptance of the system.

Once the system has been implemented, there must be a process for guiding and maintaining the system along the planned path. In management terms, this is accomplished through the functions of controlling and evaluating. The process, therefore, is one of monitoring the system for discrepancies which exist between what is happening and what was planned and, as a result of the identified discrepancies, making the necessary changes to bring the system back to the appropriate course.

At this point, the management basis for the model CMS has been explained. To fully activate the system the what, when, how and by whom must be identified. The task distribution chart on the following pages serves this function. It is designed to identify what needs to be done (the task), how it is to be done, and who has the responsibility for accomplishing the task.

TASK DISTRIBUTION CHART

WHAT	HOW	WHO
1. Develop policies and procedures. (Duties of the council, procedures for conducting meetings, and criteria for making decisions).	Through open discussion by council members, establish rules of order, procedure, and criteria.	Executive Council
2. Determine overall goals and objectives of CMS.	Determine what is expected of the CMS and state in the form of goals and objectives. Example: Goal: To promote the development of quality vocational material needs for all the approved vocational programs in Georgia. Objectives: (1) Provide a valid means of determining the legitimate curriculum material needs of each vocational instructional area. (Needs assessment) (2) Provide a curriculum coordinating unit to: (a) develop instruments, conduct needs assessments, and interpret data. (b) develop basic guidelines for curriculum materials development. (c) develop field testing procedures in consultation with instructional area supervisors, curriculum specialists and/or curriculum developers. (d) analyze field test data (gain scores, item analysis, etc.) (3) Provide a diffusion/dissemination system that ensures statewide distribution.	Executive Council
3. Develop policies and procedures (duties of the committee, procedures for conducting meetings, and criteria for making decisions. Based on policies and guidelines developed by the executive council).	Through open discussion by committee members establish rules of order.	Curriculum Coordinating Committee

	WHAT	HOW	WHO
4.	Determine overall goals and objectives of the specific instructional area based on the goals and objectives established by the executive council.	Determine the role of the committee in the CNS. State in the form of goals and objectives.	Executive Council
5.	Determine funding sources and available funds.	One of the responsibilities of the curriculum staff is to locate fiscal resources. The curriculum staff should be assisted in this by service area supervisors as well as other related units or groups. Every group, unit, and individual involved in the developmental process should be alert to any possibility of acquiring developmental funds.	Curriculum Staff
6.	Determine the importance of each course.	Collect and analyze data relative to student enrollment in each course, job opportunities, funding category, average salary, for the occupation(s), etc.	Curriculum Coordinating Committee
7.	Conduct needs assessment.	A. Develop instruments. B. Provide Guidelines for conducting assessments. C. Analyze data.	Curriculum Staff
8.	Develop short range (one year) and long range (five year) plans.	A. Develop long range and short range plans based on needs assessments and course importance. B. Revise long range plans each year based on accomplishments of previous year and latest needs and manpower data.	Curriculum Coordinating Committee
			Curriculum Staff should develop the review instrument and provide information and resources for the collection of materials.

	WHAT	HOW	WHO
9.	Review alternative solutions and select most appropriate solution.	A. Develop review instrument. B. Collect published material (state and national). C. Review materials. D. Select appropriate solution a. Revise b. Adopt/adapt c. Develop	Curriculum Coordinating Committee Curriculum Staff should develop the review instrument and provide information and resources for the collection of materials.
10.	Approve evaluation procedures.	The evaluation unit should develop basic evaluation procedures in consultation with curriculum specialists, instructional area supervisors, developers, and teacher educators for the following evaluations: (1) Planning evaluation (2) Developmental evaluation (3) Total system evaluation	Executive Council

(A comprehensive evaluation system is a necessity for the development and efficient operation of any system. Without periodic alignment the system, like an automobile, will tend to drift away from the desired path.)

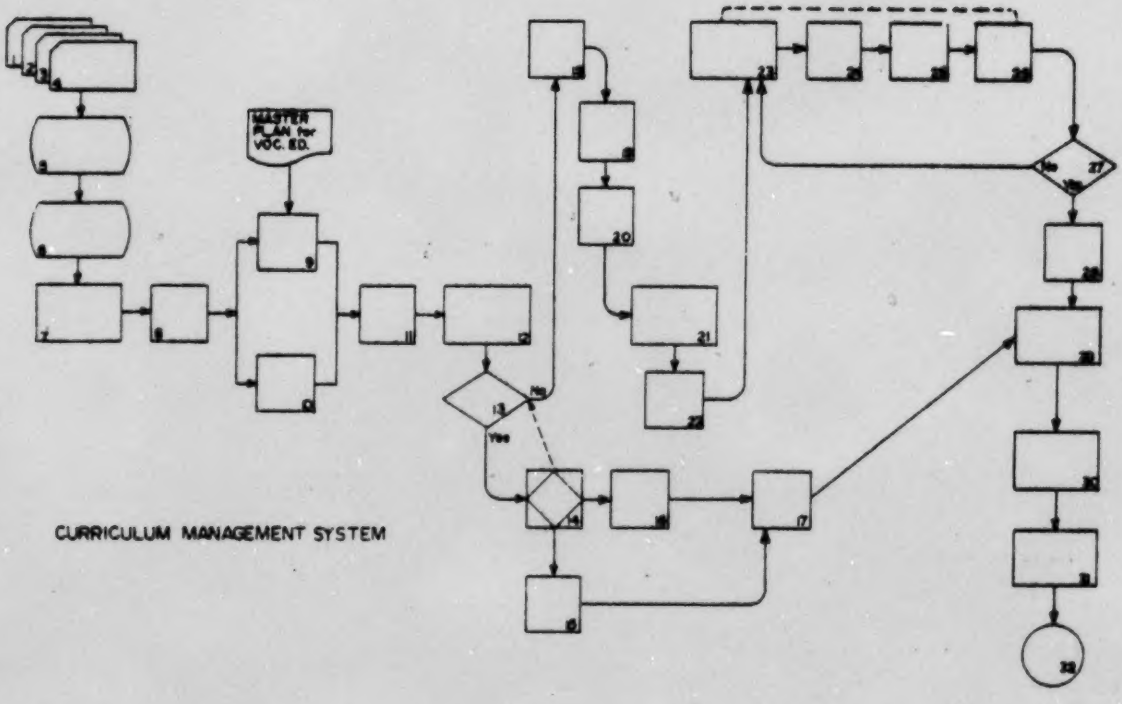
11.	Develop RFP's for curriculum development and research.	Use review criteria to develop RFP.	Curriculum Staff
12.	Approve basic specifications for RFP's.	Review specifications.	Curriculum Coordinating Council
13.	Allocate fiscal resources.	A major problem with any operation is financing. There is never enough money. To ensure equitable distribution of limited resources among competing agencies, the council would be the appropriate body to allocate the developmental resources.	Executive Council

	WHAT	HOW	WHO
14.	Administer dispersal of allocated funds.	Handle administrative details for the disbursement of allocated funds. A. Set schedules for disbursement. B. Handle expenditure reports (quarterly) for approved funds. C. Maintain files for cost analyses. D. Approve minor changes in budgets (i. e. transfers from one line item to another).	Curriculum Coordinating Committee
15.	Develop curriculum materials.	Specific developmental procedures determined by developer based on RFP specifications.	Curriculum Staff
16.	Develop field test procedures.	A. Determine criteria. B. Develop data collection instruments. C. Develop criteria for site selection. D. Develop procedures.	Curriculum Staff
17.	Coordinate all developmental activities.	A. Receive progress reports from developers. B. Compile reports for the executive council (quarterly and final). C. Disseminate information to appropriate persons, groups or agencies. D. Consult with developer as needed to maintain control and resolve problems.	Curriculum Coordinating Committee
18.	Develop diffusion and dissemination procedures.	A. Provide an opportunity for all teachers to review the materials and discuss them with field test teachers through meetings either state-wide or regional. B. Survey the teachers to determine who is interested in using the new materials. C. Provide inservice training to interested teachers (offer credit for recertification in regional or state-wide workshops. D. Set up production schedules and distribution procedures.	Curriculum Staff

	WHAT	HOW	WHO
19.	Evaluate planning and developmental processes.	Audit procedures and progress A. Set-up report procedures and timelines. B. Standardize reports (short and to the point, eliminate excess verbiage) and reporting procedure. C. Collect samples of materials developed. D. Compare activities with procedures and guidelines. E. Compile reports for executive council (council report should be a summary of periodic reports to evaluation specialist and coordinating committee, area supervisors, and area committees).	Curriculum Coordinating Committee
20.	Review developmental process.	Review the following and make recommendations relative to changes, continuation, or field testing. A. Rough drafts of materials for clarity and appropriateness. B. Objectives as they relate to content. C. Learning activities planned. D. Criterion referenced tests and performance (skill) tests.	Curriculum Coordinating Committee
21.	Conduct field tests.	A. Select sites. B. Train personnel. C. Collect data.	Curriculum Coordinating Committee
22.	Assist with field tests.	A. Provide field test criteria (handbook). B. Aid instructional area supervisors and developers in setting up field tests. C. Audit field test procedures. D. Analyze data.	Curriculum Staff
23.	Review field test data.	A. Relate test items (criterion and skill) to objectives. B. Review teacher comments. C. Review test results (gain scores, item analysis, discrimination index). D. Check length of modules (average time it takes a student to complete one module.) E. Review evaluation report.	Curriculum Coordinating Committee

	WHAT	HOW	WHO
24.	Recommend for approval, further testing, or discontinuation of project.	In consultation with evaluation specialists, curriculum specialists and/or curriculum developer after a review of the field test data. Recommendations of these persons should be considered in light of the field test data. Use recommendations and field test data as criteria for approval of developed materials. More weight should be put on recommendations except in cases of obviously negative field test data.	Curriculum Coordinating Committee
25.	Review evaluation results.	Review the evaluation results and the recommendations of the curriculum coordinating committee. Make recommendations for improvement of system for next cycle (year).	Curriculum Coordinating Committee
26.	Review field use data and make recommendations relative to revisions. (Field use data refers to data collected after the materials have been generally disseminated and used for a year or more).	Randomly survey several teachers not included in the field test regarding their opinions of the material. Also collect student data (pre/post scores, teaching methods used, additional materials introduced).	Curriculum Coordinating Committee Curriculum Staff

A MODEL STATE LEVEL CURRICULUM MANAGEMENT SYSTEM



A Model State Level Curriculum Management System

This section will describe a model curriculum management system for use by state departments of education vocational education staffs. The model is designed to flow from the overall master plan for vocational education and begins with input from the various constituents of vocational education. This input information is collected and processed by the appropriate instructional area curriculum coordinating committees (CCC). These CCC's pass the information on to the prime decision-making body (the executive council) which in turn begins its deliberation processes and assigns the required operational tasks to a curriculum unit staff. The curriculum unit, using the decision and guidance supplied by the executive council, continues the process of curriculum planning, development and implementation.

The remainder of this section of the paper will present, describe and illustrate the flow of the model. Based on the framework outlined in the overview of the model, a detailed state level CMS would contain the following components. These components are cross-referenced to the steps on the flowchart (Fig. 1) and are listed by phases.

PHASE/ACTIVITY	BLOCK NUMBER (Cross-referenced to flowchart)	ACTIVITY OR SOURCE
Input sources	1.	Teacher Educators
	2.	Local Vocational Educators
	3.	OVE Staff (SDE)
	4.	Business, Labor and Industry
Organization	5.	Instructional Area Curriculum Committee
	6.	OVE Executive Committee
	7.	OVE Curriculum Staff

PHASE/ACTIVITY	BLOCK NUMBER (cross-referenced to flowchart)	ACTIVITY OR SOURCE
Phase I	8.	Needs Assessment
	9.	Identify programs desired (based on the master plan)
	10.	Take inventory relative to that plan
	11.	Determine discrepancy between 9 & 10 and list needs
Phase II	12.	Search for existing materials
	13.	Decision: develop or procure
SUBROUTINE FOR PROCURING MATERIALS	14.	Screening process for procured materials
	15.	If ready to use the material go to block 17
	16.	Field test procured materials
	17.	State editing of procured materials
	18.	List materials to be developed in priority order
	19.	Assign funds and resources
	20.	Prepare specifications and RFP's
Phase III	21.	Select appropriate developer
	22.	Implement the developmental project
	23.	Develop materials
	24.	Face validate materials
	25.	Pilot test
	26.	Field test

PHASE/ACTIVITY	BLOCK NUMBER (cross-referenced to flowchart)	ACTIVITY OR SOURCE
	27.	Does the product work (if not, recycle)
	28.	State Editing
	29.	Have materials reproduced in quantity
	30.	Diffuse materials including staff development and materials support plan
Phase IV	31.	Evaluation
	32.	Revision

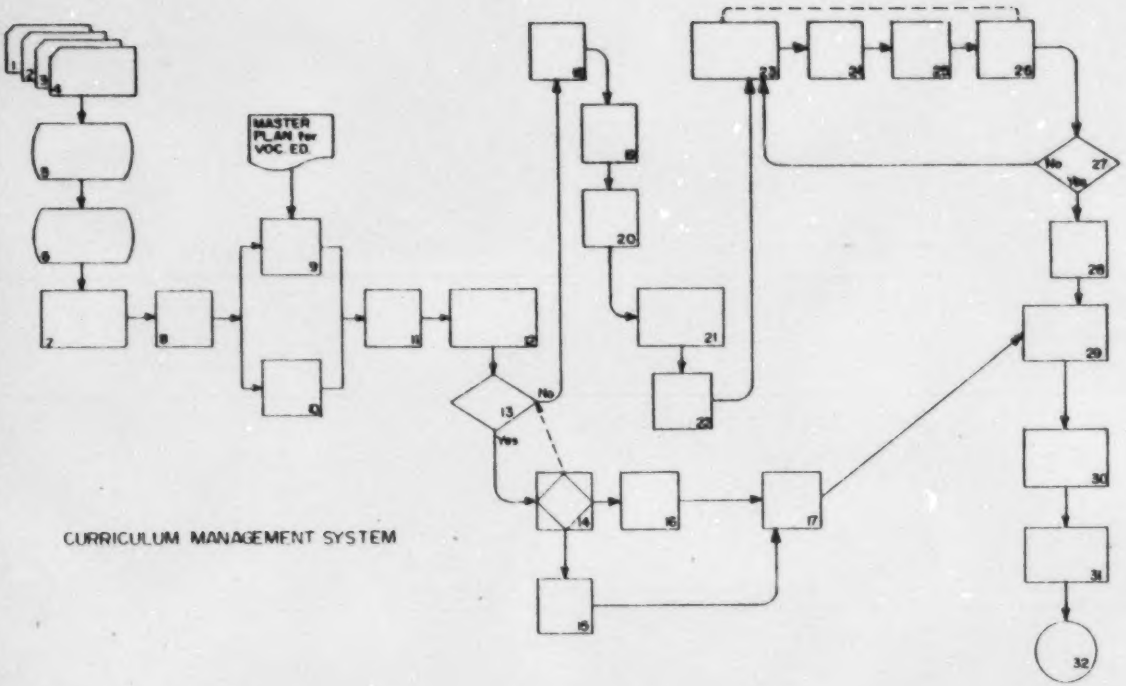

MASTER PLAN for VOC ED
No
Yes
No
Yes
CURRICULUM MANAGEMENT SYSTEM

Figure 1

The following discussion presents a detailed examination of the CMS. The discussion of each phase of the model is introduced by an integral section of the flowchart, representing that section or phase of the model followed by a detailed explanation of each component. Prior to describing the inner workings of the model, however, it is necessary to establish the primary "players" involved and their particular roles relative to a functional curriculum management system. There are three major groups of players. The executive council, headed by the state director for vocational education, serves as the ultimate decision making body. The second group is composed of curriculum coordinating committees representing the various instructional areas offered by Vocational Education (i.e., T & I, D.E., Agriculture, etc.). In addition to these two groups, there must be a full-time curriculum staff to carry out the work required by a state level curriculum management system.

The Executive Council

The Office of Vocational Education (OVE) executive council should be composed of the division heads (bureau chiefs) and chaired by the State Director of Vocational Education. It should have the continuing tasks of overseeing or monitoring the curriculum management process, reviewing developmental plans and specifications, allocating fiscal resources and evaluating the CMS. The initial task of the executive council is self-organization and the development of policies and procedures. The policies should involve determining: (1) the duties of the council, (2) procedures for conducting needs assessment and (3) criteria for making decisions. The second task of the council should be to develop basic guidelines, goals and objectives for the operation of the CMS.

The guidelines should determine responsibility for specific processes and the extent of involvement of various departments, organizations, and groups in each process of the CMS. The goals and objectives should provide direction for the system and a basis for the evaluation of the system. A third task is to determine CMS staffing needs including a curriculum coordinating unit.

Curriculum Coordinating Committees

The curriculum coordinating committees (CCC's), one for each instructional area (i.e., T & I, D.E., etc.), should be composed of teachers, curriculum specialists, state and local supervisors, teacher educators, and representatives from related business and industry. The CCC should be chaired by the head state supervisor. The initial organizational task of the committee is basically the same as that of the executive council, the development of policies, procedures and guidelines. The specific task of the committee is that of reviewing curriculum material needs and recommending solutions relative to their instructional area. Their data can be both subjective and objective in nature. Another task of the curriculum coordinating committee is to serve as an advisory panel to the curriculum staff relative to appropriate developmental projects. All of the committee's input to any developmental project is transmitted to the (SDE) curriculum staff project manager, not directly to the project staff.

The first item of work for each of the curriculum coordinating committees is to establish the ideal curriculum(s) for their instructional area(s). This ideal should relate to the realities of the context and flow from the master plan for vocational education.

The second major work activity is to accumulate an inventory of the curricular materials currently in use. Using the best analysis techniques available, and appropriate subcommittees, the CCC should attempt to discover the quality and status of all existing materials.

This committee should be organized as a permanent standing committee with a built-in rotation system for selecting and retaining members. It should be given enough prestige and status to encourage the participation of the best people in vocational education.

Curriculum Staff

The initiation of a comprehensive CMS will require personnel with specific talents and expertise in research, needs assessment, statistical analysis, curriculum design, development and evaluation. The primary function of the curriculum staff is to carry out the work of the executive council. This work should include, but is not limited to, the following tasks:

1. Preparing specifications in consultation with curriculum coordinating committees for the needs assessment and developmental activities.
2. Developing the annual curriculum contract.
3. Preparing and processing requests for proposals.
4. Initiating and monitoring developmental projects.
5. Determining further sources of available funds.
6. Developing and conducting empirical needs assessment.
7. Assisting the executive council in establishing priorities.
8. Developing proposals for Federal and private funds.
9. Administering funds allocated by the executive council for curriculum improvement.
10. Providing consultation to instructional supervisors in determining developmental costs and needs assessment/analysis.

11. Procuring curriculum materials from other states and sources and evaluating these materials for use in various vocational programs.

12. Providing direction and consultation for field testing curriculum materials.

13. Analyzing field tests and needs assessment data.

14. Providing formative and summative evaluation of the vocational curriculum.

15. Acting as an information clearing house for curriculum materials.

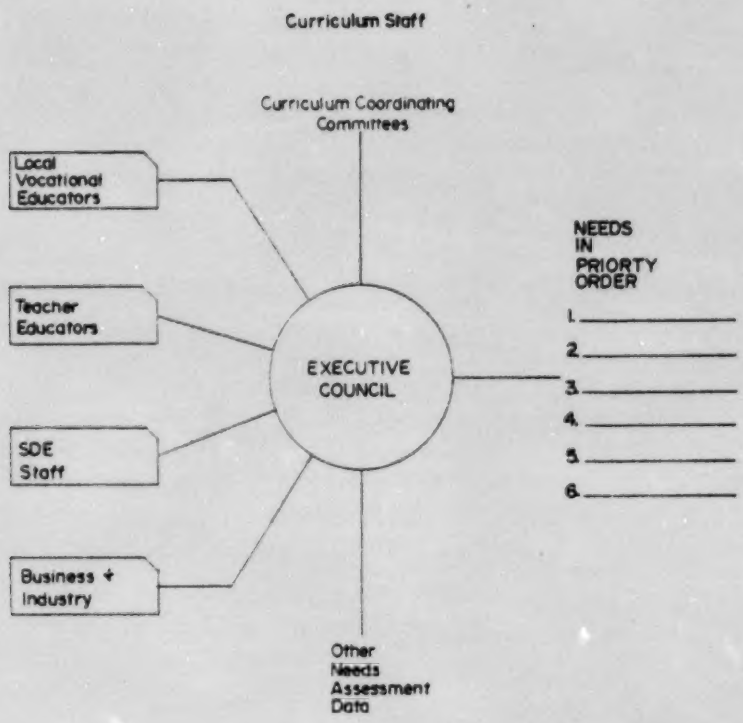


Figure 2

Initiation of Model Functions

Input Sources

The input section of the model in Figure #1 includes steps one through four. These sources of input are (but are not limited to) teacher educators, local vocational educators, state department instructional staff, business and industry. These groups provide the system with a variety of input information and data such as content expertise, program needs, quality and quantity evaluation, developmental assistance, pilot and field testing and such other feedback as may be necessary. A variety of techniques can be used by the curriculum coordinating committee to obtain information and data from each of these groups. It is

recommended that the best research techniques (i.e., surveys, interviews, etc.) be used for this purpose. The committee is also cautioned to create a climate that encourages volunteered feedback.

The information collected from these various input sources will be organized, analyzed, and prioritized by the curriculum coordinating committee (represented by block 5 of the model). The curriculum coordinating committee will prioritize its program needs by asking the following questions:

1. If we could have only one item?
2. If we could have only two items?
3. If we could have only three items?
4. If we...

The answer to each of these questions should include a rationale and a defense for the selection of that particular item. An important caveat to the curriculum coordinating committee is to take care in developing their priority list to avoid just greasing squeaking wheels. Even though there is a subjective nature in the work they are doing, it must be related as realistically as possible to the needs at hand.

Once the curriculum coordinating committee has completed its work of organizing, analyzing and prioritizing its collected information and data, a comprehensive report must be prepared and transmitted to the executive council (block 6 in the model). This report will contain a complete priority listing (including the rationale and defense for each priority) of all the curriculum needs for that instructional area.

Phase I - Identifying Needs Relative to the Desired Program

The discussion to this point has involved identification of the sources of input to the CMS and the identification of CMS staffing needs.

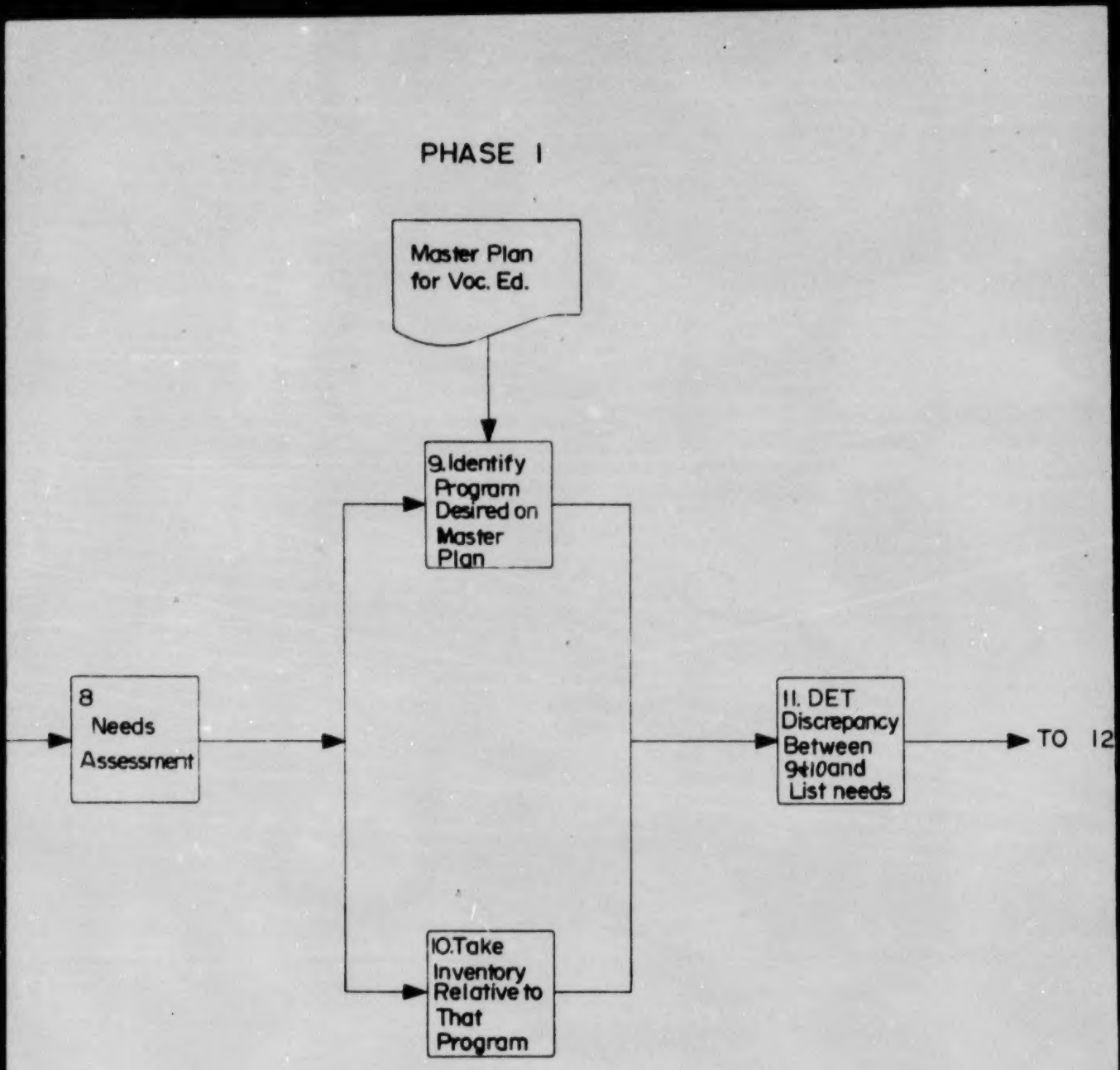

PHASE I
Master Plan for Voc. Ed.
9. Identify Program Desired on Master Plan
8 Needs Assessment
10. Take Inventory Relative to That Program
11. DET Discrepancy Between 9 & 10 and List needs
TO 12

Figure 3

The next section, which includes steps 8 through 11 of the flowchart (Fig. 1), constitutes Phase I of the CMS model (Fig. 3). Each activity in this phase is concerned with properly identifying programs which require improvement based on the results of a study of the current status of a given program (needs assessment).

To assure timely and equitable distribution of limited funds, it is imperative that a valid needs assessment be conducted before committing resources to the development of curriculum materials. A first step in a needs assessment is the development of procedures and valid instruments. The instruments may (or may not) be designed to determine the level of need through computer analysis. The procedures and instruments should be developed and validated by the curriculum unit. When the procedures and instruments have been validated, they should be published in a needs assessment handbook that will serve as a guide for all curriculum material needs assessment activities. The actual needs assessments may be conducted by a curriculum coordinating committee or by the curriculum unit. In either case the curriculum unit should provide a data analysis service.

Conducting a Needs Assessment

The basis around which the executive council should organize all input information and data is the needs assessment and the analysis of the needs assessment data. Information sheets 001 and 002 offer some general suggestions relative to needs assessment activities.

INFORMATION SHEET 001

Florida Vocational Curriculum System: Needs Assessment and Prioritization Scope of Needs Assessment

AN OVERVIEW

It is not difficult to determine a need for curriculum materials in vocational education; however, it is a very different matter to determine exactly what courses have the greatest need. Since curriculum materials can be developed for only a limited number of courses each year, there must be a method or procedure to identify those courses with the greatest need. One of the best ways to determine the extent of need is through a mathematical model that applies numerical weights to several pertinent factors to prioritize courses according to need. Such a model has been developed by the Florida State University Career Education Center. The model is based on three steps:

1. Determining the importance for each course (I),
2. Determining the discrepancy (D) from the ideal of the instructional materials currently in use in that course, and
3. Calculating a priority index (P) for each course by multiplying I x D.

This priority index is used to rank-order the course (Kromhout, 1978).

The Florida Vocational Curriculum System needs assessment and prioritization system is designed to assess individual courses within an instructional area. State vocational education programs are normally divided into several major instructional areas (i.e., agriculture, business, distributive education, health, home economics, trade and industrial arts, etc.). Each of the programs may include several courses (i.e., automechanics courses in T & I might include ignition systems, drive trains, body and trim, etc.). Thus, the number of courses in state vocational education programs

could easily total several hundred. An attempt to survey all of the vocational courses at one time would monopolize the total resources of a state vocational education department for a considerable length of time. Since this course of action does not appear to be acceptable, a means of limiting the number of courses to be surveyed is necessary.

Selecting Courses to be Surveyed. Each program supervisor/director, in conjunction with the appropriate curriculum coordinating committee, should identify ten to fifteen courses in his instructional area that have the greatest need for curriculum materials. Each of the courses selected by the program area supervisors should be ranked according to importance, using the procedure described in the following section. Fifteen to twenty of the most important courses are then selected to be surveyed to determine the quality of the materials currently in use.

Determining the Importance of Each Course. Several factors should be a considered at this point. Some of these are statewide enrollment in each course, number of job openings in the occupation, average earnings of course graduates, job placement record for graduates, and category of state funding. These and any other factors considered to be important should be determined and ranked by state and vocational administrators.

A summary of the detailed steps in determining the importance (I) for the courses follows: (Kromhout, 1978).

1. Determine importance factor weights, as shown in Table 1.
2. Enter raw data for each factor for each course (Table 2).
3. Normalize the data: For each factor (column) in the raw data, find the largest value in the column. Divide that number into each number in the column. The resulting normalized data has a maximum value of 1.00.
4. Calculate the importance (I) for each course (Table 2) by multiplying the normalized data for each factor by the factor's weight, then summing across factors.

Information Sheet
(con't)

$$I = (w_1\ a_1)+(w_2\ a_2)+(w_3\ a_3)+(w_4\ a_4)+(w_5\ a_5)$$

5. Rank-order the courses in order of (I)

Table 1

Mean Importance Factor Weights Assigned by Vocational Educators (n=59)

Factor	Mean Number of Points Assigned	S.E. of Mean S.D./square root of n
Job market demand	33	1.7
Enrollment	24	1.6
Placement statistics	15	2.3
Job earnings	10	1.0
Cost Category	8	1.1
Other	10	

Table 2

Importance Factors

		Raw data					Normalized data (w_1=33, w_2=24, w_3=15, w_4=10, w_5=8)					Importance (I)[y]	Rank by (I) (out of 111 courses)
		a_1 Job market demand	a_2 No. of students	a_3 Placement	a_4 Earnings	a_5 Cost category	a_1 Job market demand	a_2 No. of students	a_3 Placement	a_4 Earnings	a_5 Cost category		
4635	Market. & Merch. I	15661	9726	47	119	2.18	1.00	.73	.47	.54	.51	67	1
9013	Air Cond. & Htg. Mech.	825	13300	54	174	2.64	.05	1.00	.54	.78	.62	47	5
7646	General Office Clerk	10000	2972	46	110	2.18	.64	.22	.46	.50	.51	42	6
3042	Nursing - RN, AD	4054	1033	100	118	2.64	.26	.08	1.00	.53	.62	36	9
3080	Respiratory Therapy Tech.	470	108	100	140	4.26	.03	.01	1.00	.63	1.00	31	19
2757	Food Prod. & Service	4003	1460	31	130	2.64	.26	.11	.31	.59	.62	26	29
3663	Landscape Install. & Maint.	3106	1612	32	125	2.64	.20	.12	.32	.56	.62	25	33
4766	Estab., Oper. New Bus.	380	1327	30	222	1.40	.02	.10	.30	1.00	.33	20	61
3671	Nat. Resources Conserv.	166	624	26	129	4.26	.01	.05	.26	.58	1.00	19	69
9793	Motorcycle Mechanics	400	623	28	175	2.18	.03	.05	.28	.79	.51	18	78

[x]Sample calculation of normalized data::
For "job market demand, the largest raw value in the column is 15661. Divide all figures in that column by 15661 to obtain column a_1 under "normalized data."

[y]Sample calculation of I for course 4635:

$I = w_1 a_1 + w_2 a_2 + w_3 a_3 + w_4 a_4 + w_5 a_5$

$= (33)(1.00) + (24)(.73) + (15)(.47) + (10)(.54) + (8)(.51)$

$= 33 + 18 + 7 + 5 + 4 = 67$. Figures have been rounded off for clarity.

Information Sheet
(con't)

Determining Discrepancy (D)

Determining the discrepancy factor (D) involves 1) measuring the quality of instructional materials currently in use, 2) producing or developing the characteristics of "ideal" courses in the selected instructional areas and 3) determining the need for the course by examining the discrepancy between the quality of materials currently in use and the characteristics of the "ideal" materials. The first determination (measuring the quality of instructional materials currently in use) may be performed by means of a survey which measures the desirable characteristics of instructional materials (objectives, learning activities, CRT's, relevancy and validity of content, etc.). Determining the characteristics of the "ideal" instructional materials may be determined by a panel of materials development experts in the area to be examined. The Florida needs assessment model suggests the use of a modified delphi approach to accomplish this.

Using the results of the survey to measure the desirable characteristics of instructional materials currently in use as described above, average scores for each of the characteristics are obtained. The scoring system used by Florida was based on four answers: strongly agree, mildly agree, mildly disagree, and strongly disagree for each statement about the instructional materials on the survey. These answers were assigned weights, 4, 3, 2, and 1 in that order. The average score, therefore, can range from the worst, 1.0, to the perfect score of 4.0. When all of the answers are tallied, an overall mean score is obtained and the need or discrepancy in determined as the difference between the ideal score 4.0 and the mean. Therefore, discrepancy (D) is equal to 4.0 minus the mean (M) (D = 4.0 - M).

Determining the Priority Index (P)

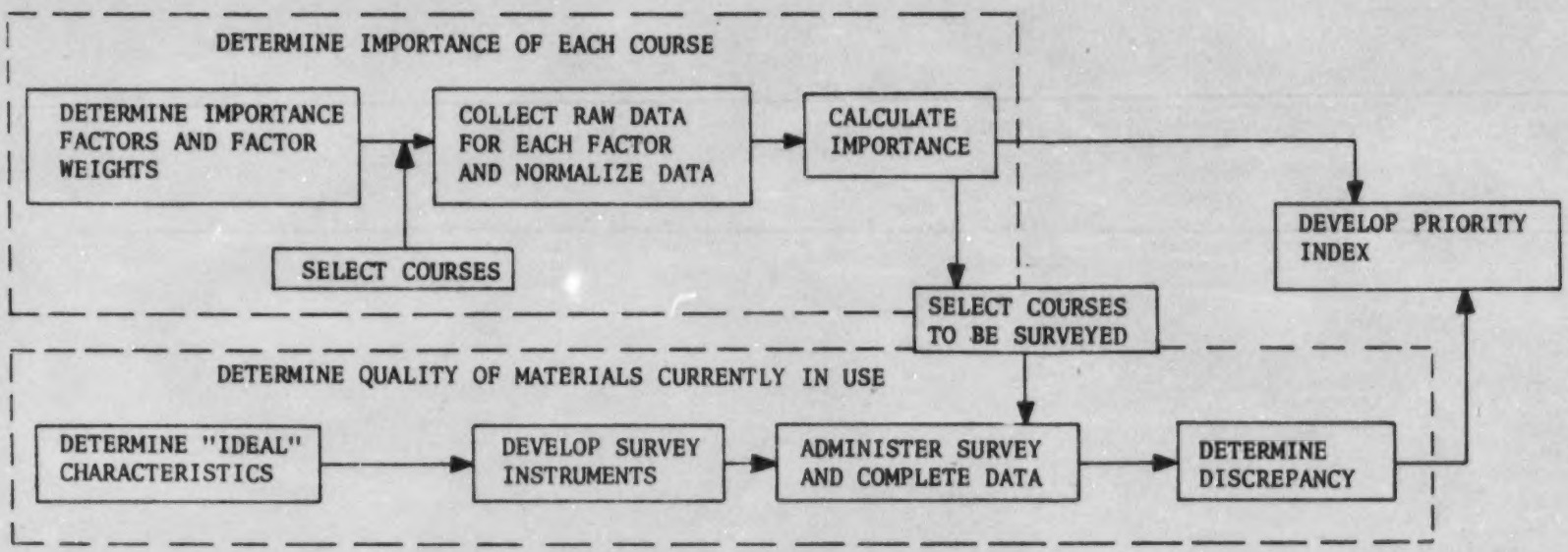
The importance of the course (I) and the discrepancy or need (D) factors have now been determined. The method for calculating the priority index is now simply a matter of multiplying the priority index times the discrepancy or need factor (I x D = P). The results thus obtained can be used to rank instructional areas by the priority index. The table on the following page provides examples of partial results obtained by Florida's Vocational Curriculum System.

The reader is warned that this presentation of Florida's needs assessment and prioritization model is simply an overview of the model and does not involve an in-depth discussion of the characteristics of the model and the procedures for implementing it. It is suggested that those interested in implementing this model contact Florida State University for appropriate materials and consultation.

Information Sheet
(con't)

Sample Results Obtained by
Florida State University
Using the Needs Assessment
and Prioritization Model

		INSTRUCTIONAL MATERIALS		
Course Title	Number	Importance (I)	Need (D) For Inst. Mats.	Priority Index (P=IxD)
Air Conditioning & Heating Mc.	9013	46.6	1.41	61.0
Nurse Aide	3041	38.9	1.56	60.7
Banking Fundamentals	4611	36.4	1.54	56.1
Air Cond., Refrig. & Heat. Tech.	8100	30.5	1.81	55.2
Marketing & Merchandising 1	4635	67.0	.79	52.9
Nursing - RN, AD	3042	35.7	1.25	44.6
Industrial Electronics	9323	30.5	1.41	43.0
Reprographics	7648	30.0	1.41	42.3
Criminal Justice Technology	8116	34.4	1.23	42.3
Electrical Wiring	9303	30.0	1.36	40.8
Word Processing	7774	30.0	1.36	40.8
Fire Science Technology	3115*	32.3	1.24	40.0
Industrial Electricity	9273	30.3	1.31	39.7
Cashiering for Sales People	4631	31.7	1.18	37.4
Electronics Technology	8028	33.6	1.11	37.3
Bookkeeper	7616	29.7	1.23	36.5
Respiratory Therapy Tech.	3080	30.5	1.16	35.4
Machine Shop	9553	32.5	1.04	33.8
Carpentry	9163	34.8	.91	31.7


DETERMINE IMPORTANCE OF EACH COURSE
DETERMINE IMPORTANCE FACTORS AND FACTOR WEIGHTS
COLLECT RAW DATA FOR EACH FACTOR AND NORMALIZE DATA
CALCULATE IMPORTANCE
DEVELOP PRIORITY INDEX
SELECT COURSES
SELECT COURSES TO BE SURVEYED
DETERMINE QUALITY OF MATERIALS CURRENTLY IN USE
DETERMINE "IDEAL" CHARACTERISTICS
DEVELOP SURVEY INSTRUMENTS
ADMINISTER SURVEY AND COMPLETE DATA
DETERMINE DISCREPANCY

(8)

Information Sheet (Con't.)

14

INFORMATION SHEET 002

A Discrepancy-Type Needs Assessment

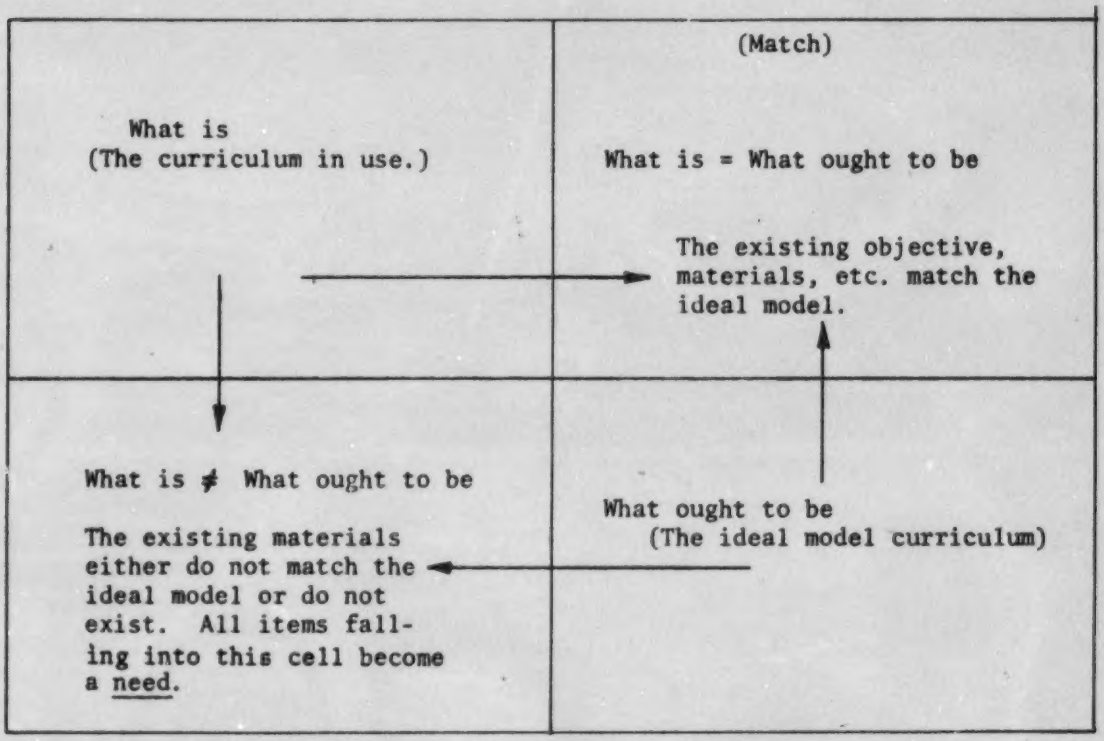
A discrepancy-type needs assessment in its simplest interpretation is a matching process. Basically, the program desired (what ought to be) is compared to the program that exists (what is) and the resulting gaps between what ought to be and what is will produce the list of needs. As an initial step in performing a curriculum needs assessment in vocational education, the ideal curriculum should be identified. To avoid developing an ideal curriculum around the biases of a few individuals, the basic input should come from the four input sources in the CMS model (teacher educators, teachers, state instructional staff and business and industry) and the Master Plan for Vocational Education. The starting point for the ideal curriculum should begin with what students completing this vocational program ought to be able to do. Working backwards from the product, all aspects of the ideal curriculum can be defined. The following sequence of activities can be used in conjunction with a variety of curriculum planning models to generate the ideal vocational curriculum.

1. Using the specified input sources-identify the spectrum of student objectives.
2. Determine all constraints (costs, time, facilities, etc.) that will delimit the spectrum of student objectives.
3. Using items one and two above, specify the objectives for the instructional program. These are sometimes classified as the missions and priorities of the program.
4. Establish the expected student mastery levels and how that mastery will be assessed.
5. Identify the necessary curriculum content. Use the results of item two to clarify the scope and sequence of the curriculum.
6. Select the primary delivery mode, instructional methods and overall curriculum design.

Information Sheet
(con't)

Primarily through the use of group dynamics, each of these six steps can be completed and the ideal curriculum prepared. Once the ideal model has been prepared, the curriculum coordinating committee can determine how well the existing curriculum compares to it. This is accomplished by first taking inventory of what is.

The "what is" inventory should begin with a listing of student objectives. It will also include the program objectives, the testing procedures, and supporting instructional materials. The discrepancy matrix below can be used as a guide for generating the list of needs.


What is
(The curriculum in use.)
(Match)
What is = What ought to be
The existing objective, materials, etc. match the ideal model.
What is ≠ What ought to be
The existing materials either do not match the ideal model or do not exist. All items falling into this cell become a need.
What ought to be
(The ideal model curriculum)

Before the identified list of needs can be finalized, a quality check must be made of the curriculum components that were a match for the ideal model. Any of these components that fail to survive the quality check must also be added to the final list of needs. Once this has been done,

criteria can be established to prioritize the needs and a short-range and long-range plan can be initiated to alleviate them. (The reader is directed to Roger A Kaufman, Educational System Planning, 1972, for further study.)

PHASE II
ACQUIRING NEEDED MATERIALS

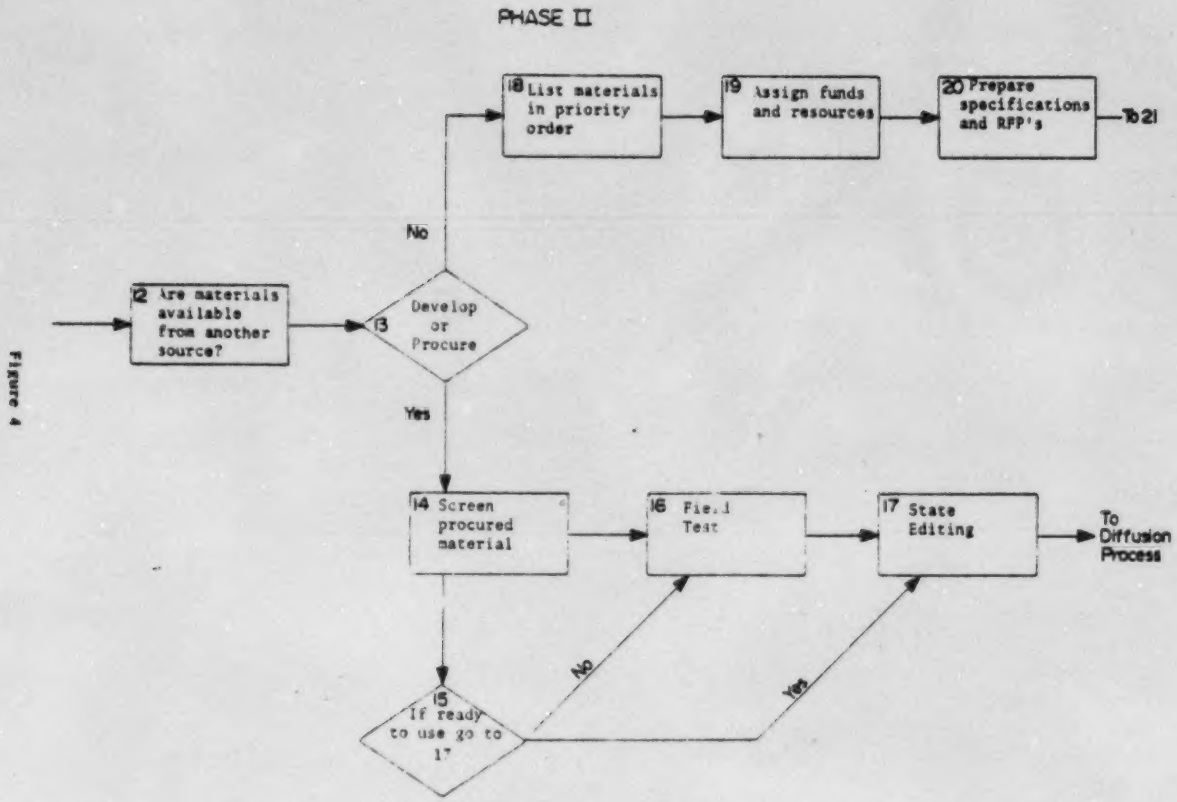


Figure 4

Phase II - Acquiring Needed Materials

Overview

Once the curriculum improvement needs have been established and the curriculum coordinating committee's report filed, the executive council and curriculum unit must look at the alternative means for resolving the needs. There are three (3) basic alternatives:

1. The needs can be resolved by revising existing materials.
2. Materials procured from other sources can be adopted or adapted to meet the needs.
3. The remaining needs will require that new materials be developed.

Phase II of the model (steps 12 through 20 in the flowchart, Fig. 1) is concerned with acquiring the needed materials. This phase, in addition to the decision to revise existing materials, consists of two major subroutines--to procure materials from other sources or to develop new materials. Step 12 of the system requires a search for existing materials. Should step 12 yield positive results (materials are available from another source), the decision block in step 13 branches to the "procure" subroutine. After the materials are procured, they are screened (step 14) to determine whether it is possible to adopt or adapt. If the materials are ready for use (i.e., can be adopted), then the subroutine skips from step 15 to step 17, state editing of procured materials and on to step 29, have materials reproduced in quantity prior to diffusion (step 30). If the procured materials are not ready for use in their current form, they must be analyzed for possible adaptation. Since this process requires modification, the model then requires that the adapted form of the procured materials be field tested (step 16). Upon positive results of the field test and state editing the model then proceeds to step 29 for reproduction in quantity.

If adaptation is unacceptable, the system returns to step 13, the decision block in which a determination is made to develop or procure. If the search in step 12 reveals that materials are not available from another source or if the adapted or adopted materials do not work, the model will branch to steps 18 through 20 which represent the processes involved in the development of <u>new</u> materials. These processes include 1) listing materials to be developed in priority order (step 18); 2) assigning funds and resources (step 19); and 3) preparing specifications and requests for proposals (step 20). The following sections will provide a further examination of each of the alternative means for resolving the needs.

Examine Alternative Solutions

The needs assessment will, in most cases, indicate the need for some improvement in curriculum materials for all courses that are assessed. This could probably be determined without a formal assessment. However, the careful analysis of the needs assessment data serves the further purpose of developing priorities to indicate the degree of need. Once the priority of needs has been established a solution must be found, reviewed, and accepted before the needs can be met. The three alternative solutions available for meeting the assessed needs, as previously presented, are (1) revise materials currently in use, (2) adopt or adapt curriculum materials from other sources, commercial and non-commercial, or (3) develop new materials. The subsequent sections of this paper will discuss the basis for examining each of the alternatives.

Revise Curriculum Materials Currently in Use

The needs assessment will provide information relative to the weaknesses and strengths of materials currently in use. The executive council, with input from the Curriculum Coordinating Committee, should review the assessment data to determine that revision is a viable alternative. In the event the review supports the decision to revise, other alternatives are not considered at this time, and plans for revision should be prepared. Two excellent indications that an existing curriculum can be improved via the revision process are:

1. The existing materials are adequate; however, technological change in the occupation has created new tasks for which additional units of instruction need to be developed.

2. An evaluation may have revealed that existing materials are adequate but poorly prepared and require revision (i.e., certain units may need to be rewritten, may need more audio-visuals or laboratory experiences, information sheets, or other improved materials).

Revision as an alternative offers four advantages over adopting/ adapting procured materials or developing new materials.

1. The cost of developing materials has already been incurred. Revision can be viewed as an "add-on" cost and should be much less than the cost of totally rewriting materials.

2. The cost of staff development should be greatly reduced as the materials to be revised are already in use and staff development sessions, if necessary, will include only instruction in the use of the revised portion of the materials, therefore requiring less time and expense.

3. The cost of materials support should be reduced since only the revised portion of the program requires printing (this may not always be true).

4. The costs of pilot and field testing can be reduced since only the revised form of the curriculum need be field tested and only on a limited scale.

Adopt or Adapt Procured Curriculum Materials

This alternative solution becomes appropriate when revision of the existing curriculum materials becomes impractical. To adopt or adapt requires the acquisition of materials from as many sources as possible, both commercial and non-commercial. A thorough search of all available sources of materials must be made and, whenever possible, descriptions of the materials should be acquired. Very often a description will provide enough information to determine whether particular materials should be more thoroughly reviewed or rejected. Copies of all curriculum materials that have shown promise should be acquired for review; then arrangements should be made by the curriculum unit for all materials to be reviewed in depth by the appropriate curriculum coordinating committee. If suitable materials are found, plans are made to adopt or adapt as needed. In order to make the decision to adopt or adapt procured materials, a screening process must exist to determine if the procured materials can be used

1) by adopting the materials in their existing form, or 2) if the materials can be modified and adapted.

Screening Process for Procured Materials: The initial determination to be made by the curriculum coordinating committee, in conjunction with the curriculum staff, is a cost analysis of the difference in cost between adapting/adopting procured material versus the cost of developing new curriculum materials. Once the total costs have been accounted for by examining each alternative, the committee may designate a certain percentage of the cost of developing new materials as the guideline for making a decision to adopt/adapt procured materials. If, for example, 50% was chosen as the guideline, and it was determined that adapting certain procured materials would require 65% of the cost necessary to develop new curriculum materials, the committee could decide to develop new curriculum materials.

Examining procured materials for possible adaptation or adoption requires more than just a consideration of the cost factors. The objectives for the selected program(s) must be examined and compared to the objectives of the procured materials. Should the objectives be incompatible then the procured materials must be rejected.

Information sheet 003 provides a method for evaluating procured materials in terms of their compatibility with the desired program. The screening process should be conducted by the curriculum coordinating committee in conjunction with the curriculum staff with input from selected teachers and final approval by the executive council. This information sheet represents the screening process in the form of a three-column table. The first column presents the questions that should be

examined by the CCC and curriculum staff in evaluating the procured materials. The second column specifies the data needed to answer each of the evaluation/screening questions. The last column indicates a method for analyzing the data. By examining each portion of the procured materials as described in the table, the CCC and curriculum staff will be able to determine if the procured materials can be adopted or adapted. Information sheet 004 illustrates seven initial steps in reviewing procured curriculum materials. These seven steps could be used as the basis for an alternative screening process.

INFORMATION SHEET 003

MATERIALS EVALUATION TABLE

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
1. Objectives A. Are the objectives appropriate to validated job tasks in the subject area. B. Are the objectives stated in behavioral terms? C. Are the objectives stated in terms easily understood by the students? D. Is the list of objectives complete?	A. List of validated tasks. B. List of objectives.	A. Compare objectives to tasks. B. Evaluate objectives.
2. Learning activities. A. Are the learning activities appropriate for the objectives? B. Are the learning activities developed in a sequential and hierarchical manner? C. Are appropriate resource materials available? D. Are the references listed in a manner that will enable the student to locate pertinent information?	A. List of objectives. B. Copies of resource materials. C. Copies of learning activities.	Compare objectives with resource materials and learning activities.
3. Student resource materials (manuals, etc.) A. Is the content accurate and appropriate	A. Pilot-test draft of materials. B. Evaluation of content by two or more content specialists. C. Evaluation of appropriateness by two or more teachers. (1)	Teachers and content specialists should read the materials making note of any discrepancies or inaccuracies in the material. --- The evaluation should be followed by a conference of the teachers, content specialists and the developer.

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
3. continued A. continued		Following the conference a report of criticisms and proposed corrections should be sent to the curriculum committee and council for information purposes.
B. Is the reading level appropriate?	1. Pilot-test draft of materials B. Evaluation by two or more teachers. C. A reading level estimating system (i.e. Graph for estimating readibility by Edward Fry, Rutgers University Reading Center, New Jersey)	Teachers comments concerning reading level.
C. Is the format correct?	A. Pilot-test draft of materials B. Format outline.	Compare materials with format outline.
D. Is the content appropriate to objectives?	A. Pilot-test draft of materials. B. List of objectives.	Compare content with stated objectives.
4. Field test site. A. Was the selection of field test sites based on pre-determined criteria?	A. A list of criteria for field test sites. B. The qualification of each field test site.	Comparison of qualification with criteria.
B. Were field test teachers adequately trained and given adequate instructions?	A. An outline of instructions and training method. B. Teacher questionnaire related to field test procedures and problems. C. Inservice activities planned.	Compare analysis of instruction and training method with an analysis of the questionnaire response and activities planned.
5. Criterion Referenced Tests. A. Do the criterion test items relate to the objective?	A. List of objectives. B. Criterion test items.	Compare objectives and test items. There should be two or more test items for each objective.
B. Did gain scores indicate significant gains in knowledge?	Pre and post-test answer sheets.	The answer sheets should be designed for machine grading. A computer program should be developed to accept information directly

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
5. continued B. continued		(continued) from the answer sheets. Compute the t-test for related measures.
C. Did 85% of the students correctly answer 85% of the test items (or other similar criteria)	Post test scores	Compute percentages. The computer program should be designed to handle this.
D. Is the test reliable?	A. The questions most frequently missed on both pre and post tests. B. The questions that were seldom if ever missed. C. The incorrect responses that were selected. (the above items refer to multiple choice questions)	Item analysis. The computer program should be designed to handle this.
E. Is the test easy to read and understand? F. Are the test items clear and to the point?		
6. Performance (skill) Test. A. Does the performance (skill) test measure appropriate skills? B. Are instructions and directions clear and easily understood by the students? C. Is the test compromised by unnecessary and excessive information? D. Are the skills being tested those that were taught? E. Were the necessary materials, tools, and equipment made available to the student when tested? F. Were the tools and equipment in good state of repair?	A. Performance test or check sheet. B. Performance objectives. C. Performance scores. D. A list of tools, equipment, and materials. E. A list of tools, equipment, and materials actually used in the skill test and a report of their state of repair. F. User evaluation of skills test (teachers and students). G. Copies of resource materials and study guides (PLACE Packages) used to teach the skills.	At least two instructional area specialists should read the test for content and appropriateness, and time allowed to complete the test. (timed tests may not always be appropriate.) Compare the list of tools, materials, and equipment needed with those available. (Any that were not in a good state of repair should be considered "not available"). (Performance scores are meaningful only if the above items are given high ratings. Unusually high or low performance scores require an evaluation of the entire procedure even if the above items are given high scores.)

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
(Due to the possible variabiability of available equipment, several variations of a skill test should be constructed. Only field test sites with the appropriate equipment for teaching and testing the particular skills should be selected. Other variations of the skill test should be spot-checked for validity and reliability after the instructional material has been distributed.)		
7. Is the developmental process on schedule?	A. Time-line or PERT chart listing the stages to be completed and the dates or time allowed for each stage. B. A chart or listing indicating the beginning and ending date for each phase or stage. C. A list of problems that may have altered the schedule. D. Progress reports at predetermined times (including B and C above).	A comparison of the time-line with completion times. The list of problems encountered should be used to indicate causes and lead to a planning session for the purpose of eliminating the problems by developing alternative schedules.

Information Sheet 004

Initial Steps in Reviewing Procured Curriculum Materials

1. Are the materials based on actual occupational tasks? How were the task statements verified? Is the content accurate?

2. Are the materials free of sex bias and sex role stereotyping?

3. Are the materials appropriate for the target population?

4. Is there a correct linkage between the objective and the learning activity (activities); the learning activity and the criterion measures? etc.

5. Are reading level and language appropriate?

6. Is there enough flexibility to allow for various learning styles, and populations (handicapped and disadvantaged)?

7. Is there variety in presentation (printed, AV, etc.)?

Field Test Procured Material: If the procured materials require adaptation, as opposed to adoption, modifications must be made in order to tailor the materials to the intended situation. Therefore, the modified version of the procured materials must be field tested in the same fashion as newly developed materials. (See Information Sheet 008.)

Develop Curriculum Materials

If it is not feasible to revise the existing materials or to procure the materials from some other source, the only alternative available to the executive council is to develop new curriculum materials. The same criteria used to screen procured materials may also be used to prepare the specifications for developing the required curriculum materials (Information Sheet 003). When more than one curriculum requires new developmental work, the executive council must establish a priority order so that available resources may be allocated to those curricula having the greatest needs.

List Materials to Be Developed in Priority Order. In Phase I of the CMS (Steps 8 through 11 of the flowchart), the system required that a needs assessment be conducted in order to identify desired curricula and that an inventory be taken of the current status of the curricula to determine the needs. The system also requires the generation of a list of available resources. In Phase I, Information Sheet 001 entitled, The Florida Vocational Curriculum System: needs assessment and prioritization scope of needs assessment, was presented as a means for listing curricula to be developed (i.e., the list of items and proposed needs). Using the data obtained in Phase I of the CMS along with a consideration of other factors, both political and economic in nature, curricula to be developed should be listed in order of priority. This function

will be performed by the OVE executive council with input from the curriculum coordinating committee. (Information Sheet 005 gives further criteria to be used in determining priority rankings.) Once the priority list is complete, funds and other resources can be assigned.

Assign Funds and Resources. The CMS now branches to Step 19 of the flowchart, assign funds and resources. Funds and resources are now assigned to the top priorities. It is not the role of the executive council to divide the funds and resources equally among all needs, but rather to allocate sufficient funds to relieve as many needs as possible. Short funding a top priority need is almost the same as not funding it at all. Funds must be allocated in sufficient quantity to bring the developmental project for the selected need to a final product that fully meets all established specifications.

Assignment of funds and resources requires a knowledge of both the various sources of funding and the methods for allocating the funds. With this knowledge it is possible to fund a developmental effort in the most efficient manner.

INFORMATION SHEET 005

Priority Determination

After all data have been collected and analyzed, the appropriate alternatives selected and specifications prepared (In some cases it will be necessary to develop the specifications through a planning grant), the executive council must organize the needs in priority order. Funds and resources can then be allocated according to the priority ranking of the needed materials. Criteria similar to the "illustrative" list below can be used to determine the priority level of each need.

Illustrative Criteria for the Executive Council to use in Establishing the Priority Order

1. Starting a new program...
2. Special case i.e., "quick start" program ...
3. Current program content has been proven to be obsolete (i.e., through V'TECS studies).
4. Programs have reached their revision phase...
5. Voids have been identified in the curriculum materials available and those required...
6. Changing instructional procedures...
7. Overall source and availability of funds...
8. The number of programs in operation at the present time...
9. The number of students enrolled in a program...
10. The newness of the program...
11. The projected number of programs for the state and the amount of vocational dollars invested...
12. The economic and societal impact of the program...
13. The need for updating and modifying existing curriculum products toward an instructional systems approach...

14. The current status of curriculum product needs...

Under special circumstances, the OVE can adjust the priority list by proclaiming a special state activity to be a critical and immediate need. (An example of such an instance would be the arrival of a new industry in the state and the need for "Quick Start" materials.)

Methods of Budgeting Funds

Sources of Funding for Curriculum Development

Funding may be obtained from a number of sources. Some possible sources of funding are:

1. State appropriations - the funds are derived from the state's budget.
2. Federal grants - grants for developmental projects that are issued through the USOE.
3. Private grants - certain foundations, corporations and other private institutions may provide grants for the development of curriculum materials.
4. Cost recovery - in certain situations, such as state departments of education and university materials centers, cost recovery is an alternative. As the term implies, the cost of developing materials is recovered through the sale of the products.

Methods for Appropriating Funds for Curriculum Development

In addition to sources of funding, a knowledge of the methods of appropriating funds is required. Methods for appropriating funds fall into one of three categories: 1) formula funds, 2) discretionary funds, and 3) project funds.

Formula funds are set aside in advance for each instructional area on the basis of the number of programs and the number of students in an instructional area. The criteria for allocation (i.e., the "formula" in terms of these numbers) should be established by the executive council and should be changed only to rectify inequities. These funds should remain fairly stable. Based on this system each instructional area would have a specified amount of money for curriculum improvement available each year. The formula funds should prevent major breakdowns in the curriculum of any instructional area while other funds are directed to major needs.

Discretionary funds are those retained by the executive council for the purpose of resolving major curriculum needs through large scale developmental efforts. These funds are allocated in two ways:

1. The majority of funds allocated by the executive council are allocated on the basis of demonstrated need supported by developmental plans, specifications, and budgets prepared by an instructional area curriculum coordinating committee and presented to the council. The funds are awarded competitively on the basis of the greatest need.

2. The executive council may also use this method:

   a. to fund approved projects in the case of unusual circumstances creating a need for funds beyond those approved,

   b. to match late funded federal proposals,

   c. to provide funds for short-term projects, and

   d. to aid in developing proposals and project planning grants.

Project funds are those funds that have been designated by an external source for a specific purpose. The allocation of such project funds is dependent upon receipt of a grant from particular funding sources (i.e., USOE, foundations, etc.).

Methods of Allocating Funds for Curriculum Development

Once funds have been appropriated for the priorities a means must be enacted to establish and finance the actual curriculum development. The most common method for accomplishing this purpose is the funding of single purpose terminal projects. Some states view curriculum improvement as a long-term function and have established a continuous funding arrangement. These two funding alternatives will be discussed here.

The project method is designed to fund short-term developmental projects. It requires that all of the steps in preparing requests for proposals and evaluating the responding proposals described in information

sheet 007 be followed. The project method has several drawbacks in that time is lost in the writing and evaluating of proposals and in such project start-up activities as staffing, establishing work relationships, procuring equipment and supplies, etcetera--all of which tend to delay the actual work of the project.

The continuous plan or annual contract method is by far the most advantageous funding method for curriculum improvement in vocational education. Under the continuous plan or annual contract method, the curriculum developer(s) is already established. This allows the tedious RFP steps to be omitted from the system. However, this method will require the use of specifications, a statement of objectives and a descriptive annual plan for accomplishing these objectives. There are some major advantages to this method.

1. Since the developmental staff remains relatively stable over the years, the stage is set for continuity and curriculum development capacity is constantly improved. In the project method, the staff must be identified and trained each time. The continuous method allows for initial training and then a continuous program of staff development. The product, as a result, is a professional curriculum development staff.

2. Wasted time is wasted money when speaking of curriculum development projects, and wasted money generally means a poorer product. The continuous plan or annual contract method eliminates or greatly reduces much of the wasted time in that there is no time lost in developing proposals or in project start-up, which under the alternative method may take several months. There is a well-trained and competent staff ready to respond and available for all developmental functions including the all important functions of revision and correction of materials (which the terminal nature of the project method generally does not encourage).

For the state that is interested in long-term curriculum improvement, the continuous plan or annual contract method may be the most appropriate.

Prepare Specifications and Requests for Proposals

The CMS model has now provided the system with the necessary information

to decide which programs to support, which programs to take priority over others and how to assign funds and resources to the development of the program. At this point specifications must be prepared for the project and products and RFP's issued to qualified respondents if the project method is to be used. In order to determine the appropriate organization to implement the project, the specifications for the project and the format for the RFP should include the kinds of information shown in Information Sheet 006. Appendix B is an example of an RFP which follows this format. The continuous plan or annual contract method will require that specifications for the products, time lines, and objectives be established as a prerequisite to funding.

INFORMATION SHEET 006

Sample Contents of a Request for Proposals (RFP)

TITLE PAGE

1. Title
2. Issuing Agency

TABLE OF CONTENTS

Topic
Content
Attachments (such as assurances or specifications and guidelines)

GLOSSARY OF TERMS

CONTENTS

The following is a list of content topics.

1. Agency issuing the RFP - identifies the agency and the title of the RFP
2. Eligible applicants - names all categories of eligible applicants.
3. Project duration - the length of the proposed project in terms of months.
4. Dates of the activity - beginning and ending dates of the project.
5. Schedule for proposals - this tells how many copies of the proposal to submit, to whom, and when and where to submit the copies.
6. Assurances - references the assurances section at the end of the RFP.
7. Funds available - the maximum amount to be funded for the project.
8. Activity goals - the overall goals of the project.
9. Rationale for activity - the need for the project to be conducted is spelled out here.
10. Specific objectives - objectives for the project.
11. Minimum requirements and specifications - the what, when, where, why and how of the project.

Information Sheet
(con't)

12. Plan for accomplishing objectives - this leaves the basic plan for accomplishing the objectives up to the writer of the proposal.

13. Management plan - a basic outline of what is to be included in the management plan for the project (i.e., time lines, staffing, etc.).

14. Evaluation - specifications for project evaluation.

15. Results - specifies quarterly and final reports.

16. Staff competencies - requires specification of staff qualifications to conduct the project in the proposal.

17. Schedule of payments - includes a schedule of when the projects expenses are paid. It is usually specified that 10% is withheld until all products are accepted and delivered.

18. Deliverable items - a schedule of finished products to be provided by the project.

19. Proposal evaluation - specifies the method of proposal evaluation.

20. Notification of action - specifies the method of notifying all proposers.

An RFP includes complete, accurate information for each of these items. In addition, the document should be presented in such a way that the entire text flows freely and provides the actual proposal outline. (See sample in Appendix B)

INFORMATION SHEET 007

Processing the RFP

In addition to the contents, the CMS requires specification of the procedure for processing an RFP. This procedure will assure the RFPs issued within the CMS guidelines would be uniform and evaluated in a standardized fashion. This information sheet offers a sample RFP processing procedure.

1. Determine specifications for the required materials.
2. Authenticate the specifications (should use content and curriculum design specialist for this purpose).
3. Establish RFP format. (See Information Sheet 006).
4. Write RFP.
5. Make multiple copies of the RFP.
6. Distribute RFP to all eligible respondents.
7. Log in proposals.
8. Evaluate proposal. (A public disclosure of how this is to be done is required. These criteria are usually outlined in the RFP. It may also be necessary to provide an appeal procedure. Standard government bidding methods could be used for these purposes.)
9. Select the proposal most appropriate for funding.
10. Perform final negotiations: proposal discrepancies, numbers of products, budget, etc. This is a critical step. The decisions made here must be final, for any attempt to alter the product once the project is underway will require major adjustments in both the timeline and the budget.
11. Fund the project.
12. Initiate the project.

PHASE III
DEVELOPING THE MATERIALS

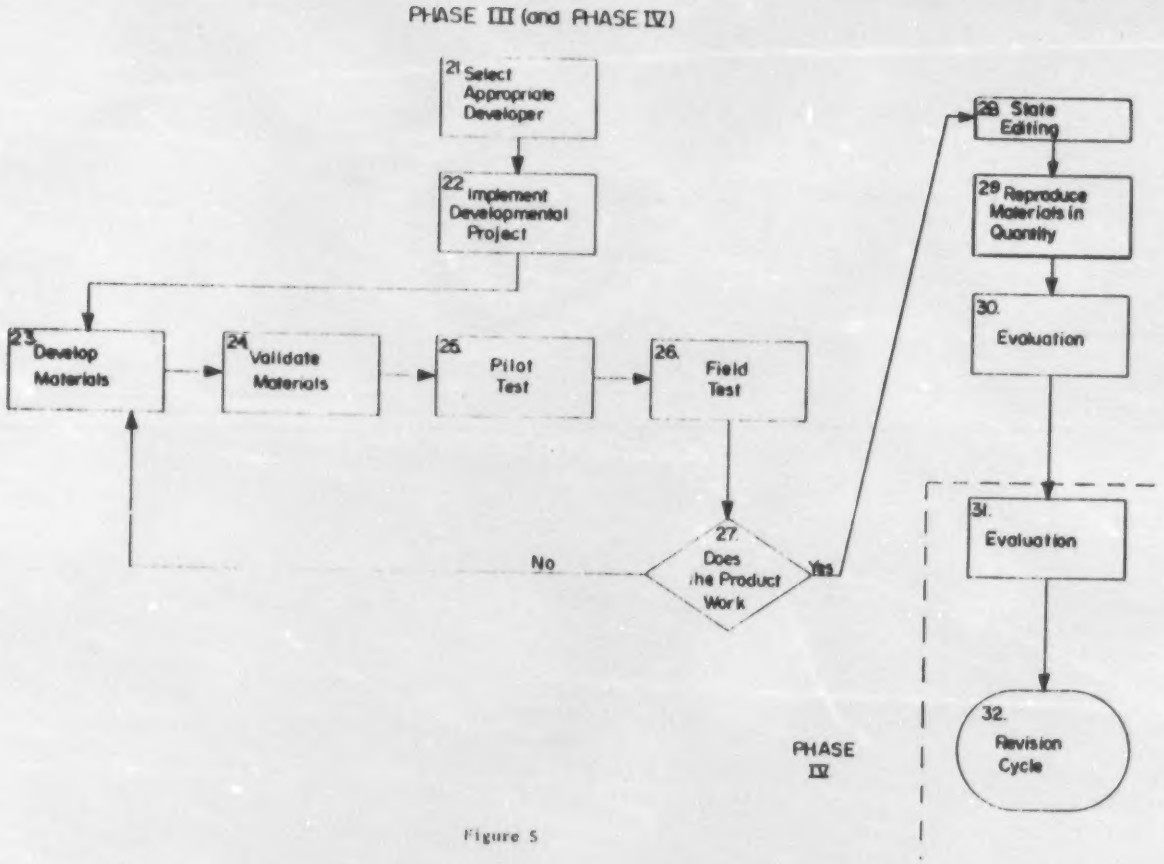


Figure 5

Phase III - Developing the Materials

The decision has now been made to develop materials (Step 21 of the CMS). Phase III of the CMS includes all steps necessary to implement and operate the developmental activities (whether by an annual plan or projects). This phase begins with the selection of the appropriate developer(s). The project method of allocating funds will be used to illustrate this phase.

Select the Appropriate Developer (Step 22)

The curriculum unit will log in and provide for the evaluation of each proposal responding to the RFP. The following items are examples

of criteria that may be used to determine the appropriate developer for a given project:

1. Expertise in field (as evidenced by sample materials)...
2. Experience in developing the types of materials needed...
3. Facilities for reproduction of materials...
4. Field test experience...
5. Support resources (library, research facilities...)

Implement the Developmental Project (Step 22)

Upon choosing the appropriate developer, the contract would be awarded and the contractor would receive clearance to implement the project. The project would follow the specifications and the timelines set forth in the proposal. The state project office would monitor the progress of the project on a regular basis and, when necessary, provide input from the curriculum coordinating committee. It is important to remember, however, that any major alteration in the project will require both expansion of timelines and the budget.

Project Monitoring

The project should be monitored by the state project office on a continuous basis through the use of standard monitoring procedures. Such procedures include quarterly reports, on-site visits, materials tryouts, discussions with project staff, and briefings with the project director.

Quarterly reports. Quarterly reports of project activities should be submitted on a regular basis to the state project office and should be in the following format:

1. Transmittal memorandum to the state project office.

2. Title page including project title, project and grant number, offices submitting the report, date and name of funding agency.

3. Period covered. (Specify the beginning and ending dates of the reporting period.)

4. Major activities and accomplishments.

5. Problems.

6. Significant findings and events.

7. Dissemination activities.

8. Staff utilization.

9. Data collection.

10. Other activities.

11. Activities planned for the next reporting period.

(An example of a typical quarterly report is in Appendix C.)

On-site visits. On-site visits may be made by staff of the curriculum unit of the state department of education as deemed necessary to determine project progress or to act in an advisory capacity.

Materials tryouts. The project may also be monitored through a tryout of actual materials. Such monitoring would necessarily occur near the end of the project as materials would have to be at or near the completion stage.

Discussion with the project staff. State project office staff may wish to confer with individual project staff in order to determine progress or to act in an advisory capacity. As a matter of protocol all contact with the project staff must be made through the project director.

Briefings with the project director. State project office staff may monitor the project through briefings with the project director. Such procedure would be primarily concerned with project management issues, but matters of design and content can and often will fall into

these discussions. Many project officers prefer to do this on a scheduled basis.

Develop Materials (Step 23)

Implementation of the project would begin the process of developing the materials which requires a knowledge of both the methods of staffing a developmental project and a curriculum materials development process.

Methods of Staffing

The staffing of curriculum development projects may fall into (but are not limited to) one of four major types. These are:

1. The professional writer: This approach employs a full-time professional writer working in conjunction with a content/ advisory committee of five to ten teachers to write curriculum materials.

2. Full-time curriculum staff: This alternative offers the best of all possible worlds. Here, professional and technical level curriculum developers can acquire a high level of expertise in the area of curriculum development. They have the capacity to respond to a variety of developmental objectives, and by maintaining such a staff, there is little lost motion in initiating a new project. This approach requires that the annual contract method of funding be used in order that a permanent full-time staff can be maintained.

3. The pilot teacher approach: The pilot teacher approach pairs a full-time graduate student assistant with a master teacher. Each has specific assignments relative to a curriculum package and each must agree on the final product.

4. Teacher educator approach: This approach requires that a teacher educator be assigned full-time responsibilities in curriculum development. The teacher educator could then work with teams of teachers in several different occupational fields at one time (not more than five) to develop curriculum.

A Model Curriculum Materials Development Process

Although it would be improper to provide a standard curriculum

development procedure that would apply to all curriculum developmental activities, it is possible to work from a basic systems design. Such a systems design can insure that all materials are prepared in a scientific fashion and that nothing has been left to chance. The concepts of instructional systems design (ISD) have been detailed in the current literature (Banathy, 1968; Gagne and Briggs, 1974; Butler, 1972) and used with increasing success by the U.S. Air Force and other military agencies. In recent years ISD has been recommended and applied to the development of vocational education materials.

The curriculum development procedure presented here represents a practical application of instructional systems design. This model has been used successfully by the Vocational Education Materials Center at The University of Georgia to develop a variety of individualized instructional materials for vocational education over the years. It contains ten basic activities, each of which is based on the preceding activity until the materials are actually implemented and evaluated. The following section will describe this procedure as a subroutine of the curriculum management system.

Synopis of related theory. The masters of curriculum theory and design tell us that the curriculum for a vocational education program must be developed in four discrete steps.

Step 1: Identify and develop the specific program objectives in detail.

Step 2: Specify the student evaluation procedure for each objective. Answer the question, "How will one know when the student has achieved a given objective?"

Step 3: Determine the appropriate content for each objective. (Essentials only--leave the "nice-to-know" information out.)

Step 4: Determine the best learning activities for the given objective and content. (These steps are based on the work of Ralph Tyler, 1949.)

Two additional factors must always be taken into account when preparing vocational curricula. These are 1) the elimination of sex bias and sex role stereotyping and 2) making provisions for disadvantaged and/or handicapped learners to participate in the curriculum.

The maintenance and development of curriculum materials for classroom/lab operations in vocational education is an ongoing activity. The guidelines in the model described here and illustrated in Figure 6 were developed both to establish materials for new programs and to maintain the existing curriculum over time. It is designed to function as a simple blueprint to aid the CMS staff in implementing a process of curriculum improvement.

Activity One: Establish the Philosophical Basis

The first major activity in any curriculum development or improvement process is to establish a basic philosophy. This statement of beliefs about vocational education will serve as the beacon for decision making throughout the entire curriculum development process.

Activity Two: Set the Missions and Priorities of the Curriculum

This initial step requires the developer to answer the question: "What end products are expected from this curriculum, and what will be the breadth and depth of the curriculum?"

2A. Specify Program Objectives

This subactivity will use the information provided in Activity Two to prepare the program objectives.

Activity Three: Perform the Occupational Analysis

The very best research techniques should be used to identify those tasks that are actually performed in the occupation. As far as possible, this information should come directly from the incumbent workers.

3A: Verify the Tasks

Once the task listing has been completed, it should be verified in the most empirical fashion.

The task listing should now be submitted to the craft advisory committee. It is best to do this in two stages - an introductory stage and a detailed review stage. The time lag between the introductory stage and the review should be sufficient to allow for careful study and analysis of the list. The review stage should be conducted during a special meeting of the craft advisory committee. Maximum attendance is necessary for this session and there should be nothing else on the agenda.

The previous steps will produce a basic task list. All that remains to be done is to relate it more specifically to the local job market and to the role of the entry level worker. A survey can be used for this purpose. (Remember, you will need to select a representative sample of workers in a scientific manner and obtain at least an 80% return from them to have a valid statement of tasks.) In addition to verifying the task list, you will want to ask these workers some specific questions. Use the following examples as guides.

a. What percent of your time is spent performing this task?

b. How long have you worked in this occupation?

c. How difficult would you rate this task to perform?

d. How difficult is this task to learn?

Do not ask too many questions. The time the worker has to respond to your survey will be limited. Therefore, it is better to get back the survey form with the basic information you need than not to get one back at all.

3B: Screen Tasks by Missions and Priorities and Other Delimiting Factors

After the survey forms have been returned, the total task list must undergo its final pruning. It is obvious that the school based program cannot cover the entire spectrum of tasks. The following criteria can be used to reduce the list to a manageable size.

a. Is this task performed by the entry level worker?

b. Could this task best be taught on the job?

c. Can the school afford the equipment to teach this task?

d. Is this a critical task that must be mastered by the student before job entry?

The task list must be hashed and rehashed until it is compatible with the school's time constraints and the target population.

Activity Four: Specify Student Objectives

After the task list has been prepared in final form, a performance objective should be written for each task. (In some cases, it will be feasible to combine two or more tasks to produce a single objective.) The term performance objective is used here to mean the demonstration of the specific worker behavior set forth in the task. Contrary to popular belief, there are several acceptable ways to prepare performance objectives. The most common is the three-part style. These parts are the conditions, behavior and standard. (i.e. Using the appropriate tools, you will be able to set the timing of the engine to manufacturer's specifications). Another method allows the use of what amounts to an objective stem (i.e., demonstrate proper bedmaking techniques). The stem represents the action and behavior required. The conditions are embodied in the lessons themselves and the standards are carried by the supporting criterion-referenced tests. This approach is less wordy and much less time-consuming for the instructor while ultimately providing the student with the necessary direction and expectations.

4A: Analyze the Learning Required for Mastery of Each Objective

The objectives have now been prepared for each task to be taught. The next activity is to identify the concepts, knowledge and skills the student must obtain to be able to perform the task and master the objectives. The learning steps should be identified and listed for each objective. These identified learning steps and the learning types will serve as the basis for preparing appropriate student activities for each unit of instruction.

4B: Sequence the Learning Tasks/Objectives

After the list of these discrete learning steps has been developed it must be sequenced to allow for prerequisite learning and to move the student from the simple to the complex.

Activity Five: Prepare Test Items

It is important to determine the mastery level of the vocational student and the only sure means is through an assessment. Assessment is also the only way to identify weaknesses in the student's knowledge and skill development. The concept of criterion-referenced testing is tailor-made to accomplish this purpose.

Criterion-referenced test (CRT) items are directly related to the stated performance objective. They are also designed to measure the performance required to accomplish a particular task. CRTs can and should be prepared to measure the mastery of both cognitive and performance skills. In addition, both validity and reliability can and should be established.

5A: Performance Test Items, Knowledge Test Items, Attitude Scales

Performance Measures

The overall scope of the performance test must be established first. From that framework a complete set of scoring criteria expressed in terms of product and process must be prepared for each criterion-referenced performance test. Check lists can then be made to improve the utility of the test.

Cognitive Measures

In developing cognitive measures, it is recommended that multiple choice, open-ended, short answers and matching items be used. True-false items have no place in a vocational learning package. Overall, the multiple choice test item is the best prospect for measuring cognitive knowledge in vocational education.

Attitude

The development and measuring of attitudes is an important aspect of vocational education. Rating scales and check sheets should be prepared for this purpose.

Activity Six: Select Appropriate Curriculum Content

To properly execute Activity Six, the objective and discrete learning steps that were prepared in Activity Four must be used. These objectives and learning steps must be valid in terms of the worker tasks selected for the occupational program. Use these validated objectives and discrete learning steps with the activities described here to identify and organize potential student learning materials for the program.

The project staff should develop a coding system by using a prefix for each phase of the program. For example, Duty 1 in the electro-mechanical cluster might be Basic Electricity. BE could become the prefix for all units in that duty area. The first objective for duty BE would be numbered as objective 1.0, and each learning step for that objective would be numbered as a decimal. For example, learning step one would be 1.1, two would be 1.2, etc. The total code for objective one, learning step one of the basic electricity duty in electro-mechanics would be BE 1.1.

6A: Search for Existing Material

The project staff should collect as many resource materials as can be found. The following sequential steps will lead to an abundant collection of materials:

1. Contact teacher educators in Division of Vocational Education.

2. Contact appropriate State Supervisor in SDE.

3. Contact commercial publishing companies.

4. Contact manufacturing companies and labor unions.

5. Conduct searches through ERIC, ARM/AIM, and the National Curriculum Network. The state supervisor can assist in the use of these processes.

6. As each item is received, it must be coded according to the appropriate objective or objectives. In addition, it should also be noted if the materials are copyrighted. If they are, a large C should be placed on the front cover of the document.

7. After the materials are coded, they should be entered into a log. This log is a simple tab sheet to help keep track of the various materials received.

8. Does this product alone or in combination with other resources represent comprehensive coverage of the objective? In the event that a product partially covers an objective to the satisfaction of the developers, it can be used on one of two ways. If the materials are in the public domain, the developer can use a cut and paste approach to get the materials into the correct learning package. However, if it is copyrighted material, it should be placed in the resource area and referenced to it by code.

6B: Screen Materials from Other Sources

The suitability of the available materials should be determined by the project staff. By this stage, a large quantity of materials will have been collected and coded. The potential value of the materials to the program will vary. The curriculum staff must now determine which materials will be adopted, adapted or rejected. Some items can be used as they are. Parts of others can be used and some can be revised to fit the program. The following suggested criteria can be used for this purpose.

1. Identifying content appropriate to the objective

2. Developing learning activities from the content (This is carried out in Activity Seven)

3. Preparing the test items

4. Supporting the learner with instructional sheets and other media when necessary

Activity Seven: Select Learning Activities

Learning activities must be selected for their capacity to transmit appropriate information and skills to the students in a meaningful fashion. They must be a "fit" for both the style and nature of the content. For example, if the students are to learn to do something--perform a specific task, then a hands-on learning activity would be most appropriate. Likewise, there is a proper time to use printed, audio-visual materials, etc.

7A: Determine Primary Delivery System

For the sake of this presentation the potential number of primary delivery systems (i.e., those major methods for establishing the overall instructional plan for a vocational education program) will be limited to four: the cluster, single skills, cooperative, and the core curriculum. This basic choice will have an impact on the kinds of learning activities selected for the curriculum. For example, there is little need for in-school hands-on experiences in a cooperative program.

7B: Determine Instructional Methods

A common decision here is whether to use individualized or traditional instruction. Current student needs and, to some extent, teacher preferences enter here. However, this decision will affect the learning activities at this point and later the packaging of the materials.

7C: Package Materials

When all missing parts and materials have been prepared, the materials may be packaged. Packages can be designed for use in groups or in an individualized instruction format.

It is recommended for vocational curricula that a package be used that lends itself to the individualized approach. Even though group instruction may be the primary mode, an occasional student, either for remedial or accelerated purposes, will need to function independently of the class. The following package outline will provide this flexibility.

1. State the measurable objective.
2. Provide some pre-check items.
3. Provide student activities with options when feasible.
4. Provide self-checks.
5. List all resource materials.
6. Provide post check items, both cognitive and performance.
7. Include the required instructional sheets in the student activities section.

Activity Eight: Evaluate the Materials

The important question now is, "Do the materials produce the desired student behaviors, and can teachers and students use them?" This should be verified, in so far as possible, before the materials are used with the entire student population. This will require three basic steps. First, edit the total set of materials for both grammar and content. Second, perform a face validation of the packages. This would include reviewing the materials to determine if they are well organized, contain the proper content, and are within the ability and reading levels of the target student population. Finally, the units should be tried out to determine that the materials do, in fact, enable the students to master the given objectives, and further ensure that teachers and students can use them.

8A: Face Validation

Face validation requires that materials be examined by a group of content experts to include experts from both industry and the teaching profession.

8B: Pilot Tests

Pilot testing includes the selection of a group of students to go through and use the materials looking for obvious and not-so-obvious flaws such as bottlenecks, sections that are not easily understood, and the like.

8C: Field Test

Once the face validation and pilot test are complete, and successful, one major concern is with the full-scale activity of field testing. Field testing determines the utility of the materials in several different schools; tests for the use of appropriate reading level, learning aids and AV equipment; and validates the materials in terms of student growth or mastery.

8D: Correct Deficits

The data acquired from the face validation, pilot test and field testing can be used to correct deficits in the materials. All revisions and corrections must be made before the materials are distributed in quantity.

Activity Nine: Install the Curriculum

Installing the curriculum requires the same care that was used to develop the system. The following steps should be adhered to when installing the materials in a given vocational program: (1) Prepare the instructor mechanically and conceptually to use the materials. (2) Prepare the physical facilities to support individualized instruction. (3) Obtain the materials and special equipment and supplies. (4) Initiate the system. (5) Monitor and continue to evaluate the program (Scott, 1979).

Activity Ten: Evaluate and Revise as Required

Curriculum evaluation is a continuous process. However, at no time is it as important as after the installation of a new curriculum. Evaluation should include, but is not limited to, the items enumerated below.

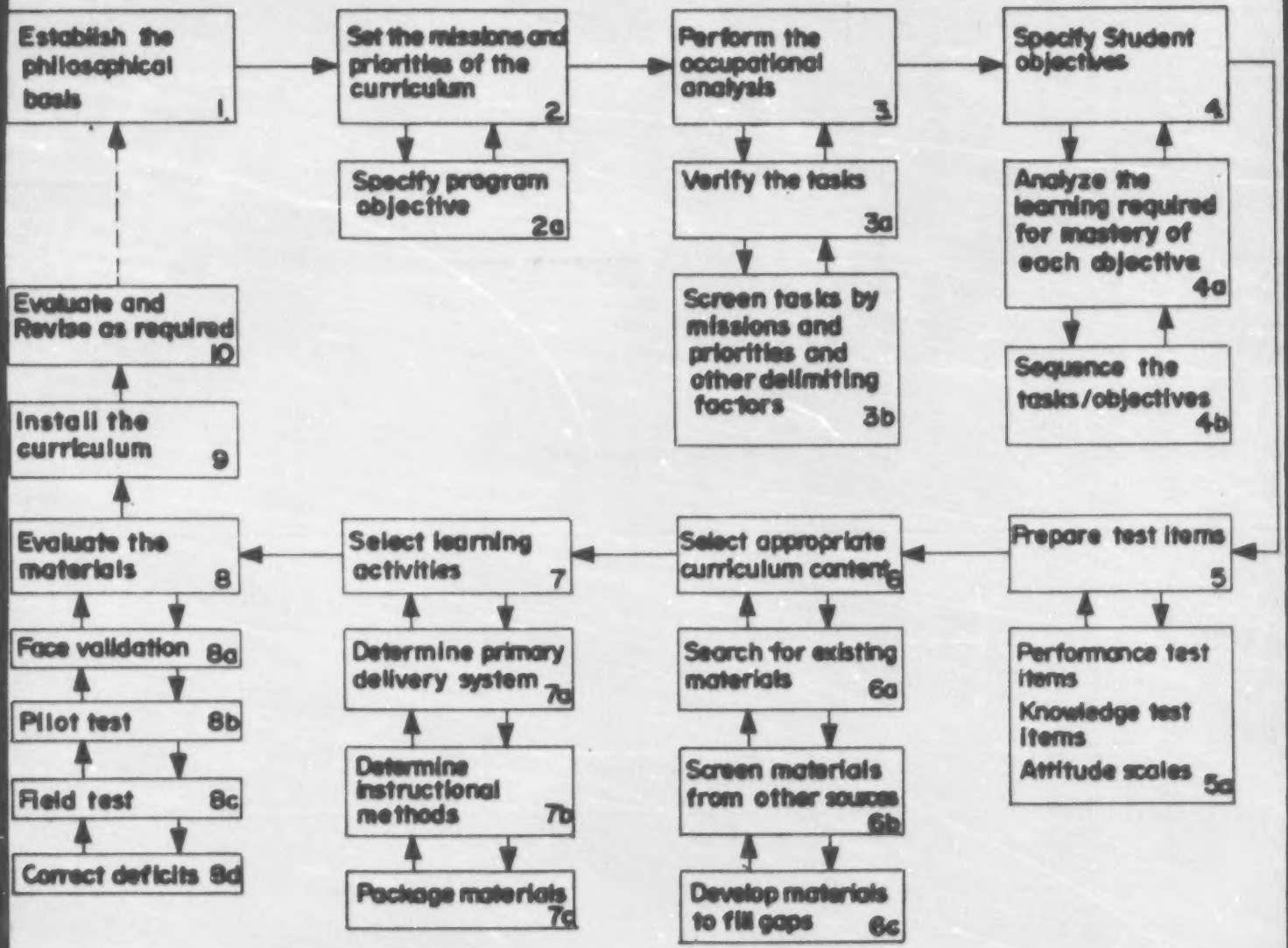
1. Determine those learning activities that present unnecessary problems to the students.

2. Note special problems that involve the materials and identify all of their shortcomings.

3. Provide for the formal assessment of the students. Cognitive and performance tests that are criterion referenced will help pinpoint those materials and learner activities that are not producing.

4. Perform a curriculum oriented follow-up of students who have completed the new curriculum. Also, seek information from a sample of their employers.

A MODEL
CURRICULUM DEVELOPMENT PROCESS


Establish the philosophical basis 1
Set the missions and priorities of the curriculum 2
Specify program objective 2a
Perform the occupational analysis 3
Verify the tasks 3a
Screen tasks by missions and priorities and other delimiting factors 3b
Specify Student objectives 4
Analyze the learning required for mastery of each objective 4a
Sequence the tasks/objectives 4b
Prepare test items 5
Performance test items
Knowledge test items
Attitude scales 5a
Select appropriate curriculum content 6
Search for existing materials 6a
Screen materials from other sources 6b
Develop materials to fill gaps 6c
Select learning activities 7
Determine primary delivery system 7a
Determine instructional methods 7b
Package materials 7c
Evaluate the materials 8
Face validation 8a
Pilot test 8b
Field test 8c
Correct deficits 8d
Install the curriculum 9
Evaluate and Revise as required 10

INFORMATION SHEET 009

A Field Test Model*

No new vocational curriculum should be disseminated or adopted without accurate information concerning its usability and effectiveness with the target population for which it was designed. "Armchairing" will not tell the curriculum developers whether a curriculum will work. No school system or teacher should blindly accept a new curriculum on the basis of the review of the developer or the testimonial of a reader. Field testing of a new curriculum serves a vital function for both the school and the developer. It gives the developer the opportunity to improve his product and gives him a means to establish evidence of its effectiveness. Hence, the goals of field testing are 1) to improve the curriculum materials being developed, and 2) to establish the degree of effectiveness of the product. Field testing should be a primary concern of all curriculum development projects and an integral part of the CMS.

Field testing is defined as the trial use of the curriculum in the intended school setting with the intended target population in multiple sites, for formative and summative (workability and effectiveness) objectives. The objectives of a field test must be:

1. Attainable within the available time,
2. Attainable within the available budget, and
3. Important to answer for the particular products.

In view of the above facts, a field test will most likely not be conducted in an ideal environment. Those conducting the field test,

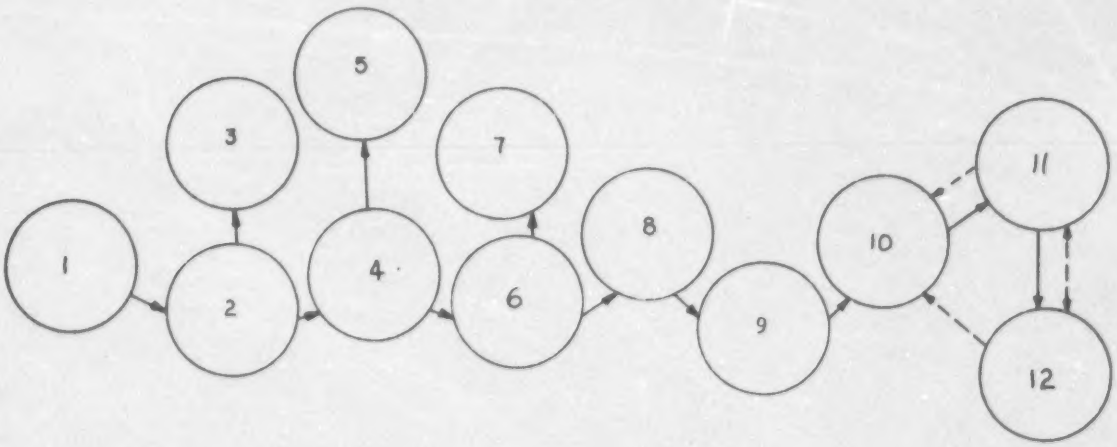
*Based on a model developed for USOE by Contract Research Corporation, 1975.

fortunately, can be aware of the constraints listed above and can conduct the field test within these constraints to obtain useable results.

Conducting A Field Test

Conducting a field test may be viewed as a twelve-step process as illustrated by the following graphic.

(Based on a Field Test Model developed for USOE
by Contract Research Corporation)



1. List potential sites.
2. Determine interest.
3. Drop uninterested candidates.
4. Determine site appropriateness.
5. Drop inappropriate sites.
6. Meet with administrators and teachers of appropriate sites to review plans.
7. Drop unwilling sites.
8. Develop agreement with selected sites
9. Train field test personnel
10. Conduct field test.
11. Analyze data and evaluate curriculum materials.
12. Revise for improvement.

The following pages will discuss each of these twelve steps in detail.

Information Sheet
(con't)

1. List Potential Sites. The selection of potential sites is a critical activity. Before any sites are considered, basic criteria for a field test site must be established. The curriculum coordinating unit should perform this function in consultation with service area supervisors, teacher educators, teachers, and developers. Some suggested criteria are 1) teacher experience and education 2) cooperative potential of site personnel (supervisor and teacher), 3) adequacy of the facilities, and 4) overall condition of the local program (excellent, good, poor). Once the criteria have been established and validated, they should become standard criteria for the selection of all potential field test sites, and be incorporated in a field test handbook. The established criteria should then be used to develop lists of potential sites. Teacher educators and service area supervisors should develop the list of potential sites. All potential sites selected at this time should be considered to be acceptable as a field test site, based on the established criteria for site selection.

2. Determine Interest. Contact the pertinent personnel at each potential site by letter. The letter should list the course to be field tested, the basic field test procedures, and an approximate date they will be contacted (preferably by phone) to ascertain their interest. After contacting each potential field test site by phone, a list of interested personnel may be compiled.

The outline below describes the information exchange which should take place between the developer and the site in order for both parties to be able to decide whether to participate together or disengage. (Contract Research Corporation, 1975)

1. Information About the Developer

- Nature of the organization and project staff
- Previous experience

Information Sheet
(con't)

2. Description of the Project

- Funding agency
- Objectives and characteristics of the curriculum
- Target population: grade level, subject class
- Duration of the curriculum

3. Description of the Field Test

- Purpose of the field test
- Types of teachers required
- Advantages to the school of participating
- Number of schools/classes participating (specify other school systems already committed, if any)
- Schedule and duration of field test
- Costs, if any, to participating schools
- Research aspects of the pilot or field test
- Responsibilities of the developer
- Responsibilities of site personnel

4. Information about the School System

- Course offerings relevant to pilot or field test
- Teacher backgrounds and other personnel necessary for pilot or field test
- Student enrollment
- Program characteristics (e.g., cooperative programs) relevant to pilot or field testing
- Enrollment procedures
- Community relationships, if relevant

5. Information about Site's Ability to Meet Field Test Requirements

- Availability to staff for training
- Willingness to maintain curriculum logs
- Willingness to score tests
- Availability of student data (policies regarding confidentiality)
- Ability of students to participate in field trips, if required (including ability to pay for transportation; parents' approval, etc.)
- Willingness of teachers to conform to the curriculum plan

3. Drop Uninterested Candidates. Those who are not interested should be dropped from the list of potential field test sites.

4. Determine Site Appropriateness. The service area supervisor(s) and teacher educators should at this time divide the list of interested sites according to state administrative districts or regions and list each

potential site according to appropriateness. Three of the criteria used to develop the initial list should be used to order the lists. They are 1) teacher experience and education, 2) adequacy of the facilities, and 3) overall condition of the local program. All sites not acceptable as field test sites should have been eliminated in the first step.

An advantage of developing lists of potential sites according to districts or regions is to provide each area of the state with a test site or sites. This will assist in the diffusion process by providing other teachers with an opportunity to observe field test sites and/or discuss the potential of the materials with experienced teachers.

5. Drop Inappropriate Sites. Those sites which do not meet the criteria for site appropriateness should be dropped. The decision to drop a site should be made objectively.

6. Meet with administrators and teachers of appropriate sites to review plans. The district or regional lists are used to determine the specific sites. Following the order of the lists, meet with administrators and teachers at each selected site. At this time, a detailed plan should be presented for their consideration. The basis for this plan is the curriculum installation procedure. Each step of the field test procedure must be clearly explained, indicating what will be expected of the field test site and what services will be furnished by the developer or field director. If, following the review and discussion of plans, a site is unwilling to participate, the next potential site on the list should be contacted.

7. Drop Unwilling Site. If the terms of the field test procedure are not acceptable to the potential site, the site should be dropped.

8. Develop Written Agreements with Selected Sites. If the terms of the field test procedure are acceptable to the parties, a written agreement should be developed. The written agreement should detail all requirements in clear concise language and should not contain any surprises. The curriculum coordinating unit should develop a standard agreement form, in consultation with developers, and administrators, to be included in a field test handbook. The following is an outline of what may be included in the written agreement (Contract Research Corporation, 1975).

Memorandum of Agreement

Duration of Curriculum: length of curriculum test

Student Selection Procedures: especially when research design requires specific procedures.

Training: the amount of training which the developer would provide to teachers and others, both in the curriculum materials and in instrument use.

Assistance and Monitoring: the amount of technical assistance provided by the developer and its form (e.g., site visitations, mail communications, or telephone conversations) and the availability of site personnel.

Materials: the quantity of curriculum materials, reporting forms, test instruments, etc., furnished by the developer and reproduction requirements of the test site. Party responsible for reproduction of materials should also be indicated.

Data Collection: the data required by the developer, party responsible for its collection, such as demographic information, correction of pre- and post-tests.

In order to accomplish data analysis on schedule, specific dates for accomplishment of data collection tasks and transmittal of data should be specified.

Implementation Plan: the site's schedule and form of curriculum implementation and procedures necessary to modify plan by mutual consent.

Teacher Records: methods for reporting curriculum recommendations.

Reports: the developer and test site's obligations for written or oral progress reports should be specified.

Evaluation: requirements of the developer in reporting out on the field test and reporting back to the site.

Dissemination: developer's responsibility for furnishing test site with revised curriculum materials following completion of field test and revisions.

9. Train Field Test Personnel. The field test personnel must be instructed in the field test procedures. They must be cognizant of the importance of maintaining the integrity of the field test procedure. The field test personnel will need opportunity to review the materials and clarify any concerns. They must clearly understand what data will be collected, why it is important, and what procedures to follow in collecting the data. Data collection forms, such as a teacher evaluation and student evaluation forms, must be reviewed and explained (see attached examples). Do not assume that any form is self-explanatory. Each item on every form must be covered, in detail, during the review. Examples of completed forms should be available to the participants.

10. Conduct the Field Test. If possible, the materials for the field test should be delivered in person and all items should be inventoried with the participant to make sure everything that is needed is available and in good condition. During the time the field test is in progress, the director or supervisor of the field test should be available for consultation with the field test personnel either by phone or through an on-site visit throughout the field test period. On site-visits should be made if the length of the field test is sufficient.

Immediately following the completion of the field test, a follow-up visit should be made to the field test site to collect the data and interview the field test personnel. Valuable information and insights

relative to the appropriateness and effectiveness of the curriculum materials can be gained through a personal interview. A follow-up meeting of the field test personnel would also be beneficial to the evaluation of the materials.

What does the field test staff look for during the course of the field test? The following is a guide which suggests a site monitoring procedure (Contract Research Corporation, 1975).

Guide for Site Monitoring

1. Assess General Student Reaction
   a. From discussion with teacher
   b. From class observation
2. Assess General Teacher Performance
3. Observe class and summarize class activities
4. Review and Collect Classroom Log Sheets
5. Review/Collect Results of Pre-Tests (Test and Control Groups)
6. Review/Collect Class Demographic Data, Interim Tests
7. Discuss Level of Difficulty of Curriculum
   a. Discuss problems
   b. Social interaction of slow and advanced student
   c. Methods of dealing with problems
8. Determine Use of Outside Resource Personnel and Field Trips
9. Discuss/Decide Any Modifications to Original Implementation Plan

Information Sheet
(con't)

11. Analyze Data and Evaluate Curriculum Materials. Data collection procedures and methods should be determined before contracting for the development of the materials. The curriculum coordinating unit should develop a computer program to process the data and acquire or design instruments appropriate to computer analysis. Analyses that should be performed by computer are 1) compare pre- and post-test scores, 2) test for related measures to analyze pre- and post-scores, 3) analysis of reading level, 4) reliability of the test, 5) test items analysis (multiple choice tests), and 6) analysis of the students' evaluation of the materials. Normally, the number of teacher participants will be small, therefore making an analysis of their evaluation of the materials relatively easy to perform by hand, although a computer program could be used to perform this analysis.

The evaluation of the materials is made by comparing the various analyses with predetermined criteria (i.e., an acceptable reading level for the student population). The criteria should be standardized through successful use over a period of time and included in a field test manual. Following the computer analysis, personnel from the curriculum coordinating unit should meet with the developer to review the analysis and determine what, if any, revisions must be made. A decision to revise should be based on the criteria included in the developmental contract and the recommendations of the content specialists. (This illustrates one of the prime advantages for having full time curriculum developers.) Most projects are completed with the termination of the field test and the disbanding of the staff, leaving no one to clear up problems found in the field test exercise.

The primary reason for the field test, in addition to determining if the product works and discovering any errors which exist, is to determine

if the product is useable and to what extent. The following table suggests a method for determining usability (Contract Research Corporation, 1975).

Table 3-D.

QUESTIONS OF USABILITY	Scale of Inquiry
I. IS THE PRODUCT USABLE?	One Site
How can the curriculum be improved?	
1. Does a particular curriculum component, strategy or activity work as designed?	
2. Can the total curriculum be implemented in a real classroom setting?	
3. Is the curriculum usable without developer assistance?	
• Are the instructions clear?	
• Are the materials available?	
• Is the reading level appropriate for students?	
4. Can the curriculum or program be installed using normally available resources?	
5. Can a teacher without special training in the content implement the curriculum?	
• What types of training, support, resource personnel are necessary to implement the curriculum?	
6. Do teachers/students accept the curriculum?	
• Is interest demonstrated in the content?	
• Are the instructional methods motivating?	
7. Is the content adequate to meet the objectives?	
8. Are the instructional methods suitable for goals sought?	
II. DIFFERENTIAL USABILITY	
9. Is the product more usable in some situations than in others?	Several-mini Sites
• Is the curriculum equally usable in different institutional settings?	
• Can teachers with different training/ backgrounds implement the curriculum equally well?	
10. Can variations in the ability to implement the curriculum be related to sites, student, and/or teacher characteristics?	Many Sites

Another very important consideration of the field test is to answer the question, "Do the materials teach?" Tennyson (1976) answers this question by saying,

> The most important question at this point is, "Do the Instructional materials teach?" There is only one way to really test this question, and that is to compare learners who have taken the instruction with those who haven't. There are variations of this control group design and many sources which can illustrate them. The point here is that some form of multiple group comparison is necessary to complete a summative evaluation. The usual design format is:
>
> Group 1 → Pretest → Instructional Materials → Posttest
>
> Group 2 → Pretest → No Instructional Materials → Posttest
>
> The control group receives the pretest and posttest but not the instruction. The instructional materials group receives both the tests and the instruction. At this point group means (average scores of learners) are studied rather than individual scores as in the formative evaluation. Also, the two groups should be samples from the same population. This can be checked by seeing if the pretest mean scores are similar. There should be no basic differences between the two groups on the pretest. However, on the posttest the mean scores should be significantly different. If the group sizes are large enough a statistical test can and perhaps should be done. As mentioned above, different parts of the instructional design can be tested with this multiple group comparison design. Simply leave out of the instructional materials those items that are questionable and test the remaining design variables against the complete materials. The design is:
>
> Group 1 → Pretest → Full Instruction → Posttest
>
> Group 2 → Pretest → Partial Instruction → Posttest
>
> Of course, it is possible to include additional partial groups; only the number of questionable design variables and number of learners limit the number of groups. In summary, at least the first comparison should be done. The others may be conducted if certain design alternatives are being considered.

Information Sheet
(con't)

12. Revise for Improvement. Following a decision to revise, the necessary revisions are outlined and the curriculum staff should proceed to make the changes. A decision to field test a second time will depend on the type and extent of the revisions. The following dicussion serves to clarify the process of curriculum revisions (Contract Research Corporation, 1975).

Revision of the curriculum is likely to be accomplished as an ongoing process in response to teacher recommendations and direct observation by the developer. Revisions directed at clarifying materials, improving in-class instructional strategies, etc., require no statistical evidence or consensus. The reasonable judgment of one teacher or one student may be sufficient basis to modify the curriculum.

Revisions based on evidence of student learning, however, are more difficult to extract from field test results. Item analysis may help to identify weaknesses in the curriculum. Ambiguous evidence, however, complicates the developer's decision. For example, if some classes do well and others do not, a series of judgments must be made about the reasons for different levels of student achievement to determine whether curriculum changes are warranted. In some instances, the quality of implementation may explain differential performance and reduce the importance of the less successful class. On the other hand, the quality of implementation may be related to curriculum characteristics which need improvement. This latter type of information is likely to be obtained through observations of the curriculum in use. Some differences in performance will be explainable by initial differences in student characteristics, including general in-school achievement levels, especially where randomization of

the population was not accomplished. A range of explanations, including teacher motivation and interest (which influence quality of implementation), and quality of data (instruments and collection procedures) must be considered.

Meeting the information needs of user audiences brings the developer full circle to the point of origin of the curriculum test: the identification of users and their needs for evidence. The final step in the field test process is thereby completed.

SAMPLE STUDENT EVALUATION FORM

SCHOOL _____

STUDENT NAME _____

STARTING TIME _____ ENDING TIME _____

1. Were the directions in this task in the right order? ___ YES ___ NO
2. Were any steps you needed left out of the directions? ___ YES ___ NO
3. Did you understand each step well enough to do your job right?
___ YES ___ NO
4. Which step(s) did you not understand?

_____

_____

_____

5. Did you think there were too many directions? ___ YES ___ NO
6. Which directions do you think could have been left out?

_____

_____

_____

7. Was there enough narration with each slide so that you understood what was shown? ___ YES ___ NO

IF NO:

7a. Which slides needed more narration?

SLIDE SET NO. _____ SLIDE NO(s) _____

8. Are any more slides needed for the narration given? ___ YES ___ NO

IF YES:

8a. Which slide sets needed improvement?

SLIDE SET NO. _____ SLIDE NO(s) _____

9. Were there any terms used in the audio visuals that you did not understand?

___YES ___ NO

Please list if yes:

Information Sheet
(con't)

SAMPLE INSTRUCTOR EVALUATION FORM

SCHOOL _____ UNIT NO. _____

1. List the questions students ask you while doing this unit?

2. List mistakes students made while doing this task.

3. Were the text assignments adequate for the task? ___ YES ___ NO
If not, please list your suggestions for additional assignments.

4. Do the materials presented in this unit cover the theory and practices needed for this task? ___ YES ___ NO

5. Is more information than needed given? ___ YES ___ NO

5a. What material should be deleted?

6. Are the information and procedures used in this unit in agreement with standards accepted in practice today? ___ YES ___ NO

6a. What changes are needed?

7. In your opinion, did the students have to ask you for too much of your assistance to complete the objective? ___YES ___NO

7a. In what areas was your assistance needed?

Information Sheet
(Con't.)

8. Were there any students who were not able to complete the objective(s) of this unit to your satisfaction?

9. Please make any general comments as to how we may improve this unit.

Does the Product Work? (If Not Recycle)

After completing the developmental processes (Steps 23-26) the CMS model branches to Step 27 of the flowchart to ask the question, "Does the product work?" At this point there is a conditional, "if not, then recycle" at which point the system would return to Step 23, "develop materials" and be recycled until the product either performs properly or further field tests support a conclusion that the problems cannot be corrected, in which case the process ceases. If the product does work, the system continues to Step 28, state editing of the materials, followed by Step 29, in which materials are reproduced in sufficient quantities to be diffused.

Have the Materials Reproduced in Quantity

Once the decision has been made that the materials are functional, the curriculum should then be edited by the state department of education and be reproduced in quantities sufficient to be diffused and disseminated. As stated in the introduction, there are three basic ways to have the materials reproduced: 1) private publishers, 2) commercial printers, or 3) state department or university materials centers. The current trend is to use the state department or university materials centers, for both the economic and convenience factors mentioned in the introduction.

Diffusion/Dissemination

All curriculum development activities should be designed to relieve a particular need. However, to ultimately resolve that need, the materials must be used by teachers and students. This mandates that the CMS include a highly developed diffusion/dissemination process.

For the purpose of this model, diffusion will be defined as the organized installation of new curricular materials including maintenance or support until these materials become "institutionalized." Dissemination will be used to mean the simple distribution of curricular materials without concern for any specific support. (The authors recognize that these are not necessarily the accepted definitions of these terms, but believe it is important to distinguish them in this way. Such a distinction can enhance the means through which curriculum leaders can go about their improvement efforts.)

Havelock (1969), Rogers (1962), and Rogers and Shoemaker (1971) have presented both conceptual and working models for diffusing new practices and materials. Based on their work, a planning guide and specific implementation suggestions will be presented here.

Diffusion Planning Guidelines

1. Make the target teachers aware of the new materials and promote these materials in a positive, non-threatening fashion.

2. Stimulate interest in the new materials and increase the flow of information about the materials and what they are intended to do.

3. Provide opportunities for the target teachers to evaluate the materials. This can be accomplished through seminars and full-scale demonstration programs operated in one of the schools.

4. Prepare selected target teachers for a full tryout of the new materials. This requires a fully operational staff development effort.

5. Assist the target teachers in absorbing the new materials into their classroom/shop environments. This will require continuous staff development and a materials support plan.

6. Complete the integration of the materials into the existing instructional program. This is primarily the responsibility of the local administration. They must support the teachers in their maintenance functions.

Sample Diffusion Plan

1. Ascertain that the materials are ready for use by all teachers.

2. Establish demonstration schools. The field test sites can usually serve this purpose. This stage would also include presentations and seminars designed to inform the appropriate teachers and administrators of the availability of the materials.

3. Arrange for all teachers who indicate an interest to review the materials both as an object and in the demonstration schools. Note here that the diffusion of the materials must ultimately reach all teachers of that program, but the initial work should be directed toward those target teachers who are most likely to succeed. The remaining teachers can be added over a period of time. Remember too, that administrative fiat is the least likely method for educational improvement over time.

4. Prepare the supporting staff development plan for implementing the new materials. (This may be in the form of an inservice training session or sessions held at listrict or regional meetings and special workshops or at state meetings or through certain teacher education activities through colleges and universities.)

5. Prepare the materials support plan for implementing the materials. (This should include specification of the individuals or agencies responsible for the production, storage and delivery of the materials such as a state department or university materials center.)

6. Select the target teachers who will be the first to install the new materials. The more care used in this selection, the better the possibilities are for the long-term, total implementation of the curriculum.

7. Activate the staff development plan and at the appropriate time, within the framework of staff development, implement the materials support plan.

8. Use a reward system to give participating teachers recognition for their work.

9. Maintain support until the teachers have made the materials/curriculum a functional part of their program. Never desert a teacher in the middle of an innovative implementation.

Evaluation of Diffusion and Dissemination

In order to determine the causes of success or failure of the diffusion and subsequent dissemination of the curriculum materials, the curriculum staff must develop procedures designed such that the staff is able to

evaluate the components of each process. Information Sheet 010 provides an instrument for evaluating diffusion and dissemination. This evaluation instrument is designed as a three-column table. The first column contains the evaluation questions necessary to examine each component in detail. In the second column, the data required to arrive at the answers to the questions are specified. Finally, the third column specifies how the data are to be analyzed to arrive at the answers. The results of the evaluation can be used to correct any errors in the diffusion/dissemination process.

Information Sheet 010

DIFFUSION/DISSEMINATION EVALUATION TABLE

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
1. Diffusion A. Is there evidence of advance planning? B. Were teachers informed of materials during development phase? C. Were teachers provided an opportunity to observe the materials in use? D. Were materials provided to all teachers for preview? E. Were the materials explained to the teachers? F. Did the teachers have adequate opportunity to discuss the materials with field test teachers and/or developers? G. Were the teachers surveyed to determine their interest in adopting? H. Were the diffusion activities timely?	A. Diffusion plan and date completed. B. A report of all diffusion activities: (1) Date of activity (2) Extent of activity (3) Number of teachers contacted in each activity (4) Number of teachers in curriculum area (5) Number of teachers interested in adopting C. Teachers' evaluations of materials and diffusion activities.	Analyze plans for completeness and appropriateness. Compare activities with results. Analyze teacher evaluations.
2. Dissemination A. Is there evidence of advance planning? B. Were production capabilities adequate? C. Were storage facilities adequate? D. Were materials ready for delivery when needed?	A. Dissemination plan and date completed? B. A report of all dissemination activities: (1) Date of activity (2) Extent of activity C. Teacher evaluations of dissemination activities (random sample). D. A set of reproduced materials.	Analyze for completeness and appropriateness. Compare activities with results. Analyze teacher evaluations. Evaluate quality of materials.

(1)

DIFFUSION/DISSEMINATION EVALUATION

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
E. Were orders filled promptly and correctly? F. Was delivery timely? G. Is the reproduction quality of the materials excellent, good, adequate, or poor?		

Phase IV - Evaluation and Revision of the CMS

Phase IV of the CMS, which is concerned with evaluation and revision, provides the CMS with its most dynamic components. The processes of evaluation and revision are ongoing processes with regularly scheduled evaluations and resulting revisions occurring at intervals to be specified by the executive council. When addressing the processes of evaluation and revision with respect to the CMS, the concern is with system evaluation (as opposed to evaluation of materials).

Evaluation of the CMS

For the purpose of objectivity, an independent project evaluator should be used to conduct the summative evaluation. It would also be good to have an independent evaluation of the processes of each component during the formative stages of the system. The first two or three years are crucial in the development and establishment of any system. It is during this period that errors in design are determined and corrected, and standards of operation are set up. When the system has been developed to the point that many of the processes have become standardized, a process evaluation should be able to maintain the integrity of the system.

Since a system is made up of two or more components that are interdependent that is, each component contributes to the success of, or failure of, all other components, a process evaluation should monitor the individual components as well as the total system. The failure of any one of these components will be reflected as an error in the total system. In order to produce the desired results through the evaluation, specific criteria must be developed for each component of the system. The table at the end of this section includes a suggested system evaluation plan

which gives examples of these criteria. This systems evaluation plan is designed as a table with three columns. The first column consists of questions which are designed to analyze the components of the CMS. In the second column, the data required to answer the questions are specified. The third column provides particular methods of analyzing the data to arrive at the answers.

Revision Cycle

Evaluation of the CMS will reveal any systems errors which may exist. Once systems errors are discovered, the executive council with appropriate input should decide on the necessary revision of the system. Upon completion of the revision cycle, the system should be re-evaluated, especially in the problem areas, to determine if the revisions produced the necessary corrections.

SYSTEMS EVALUATION TABLE

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
1. General A. Were system procedures and guidelines followed?	A. Written list of proposed procedures and guidelines. B. Written list of procedures followed. C. Written reasons for not following procedures. D. Copy of notification to council and evaluation of intent to alter procedures with justification.	Compare actual procedures with proposed procedures. Note discrepancies. Note justification of discrepany. Evaluate proposed and actual procedures to determine whether changes are needed.
B. Were there problems of coordination between various individuals, units, or groups?	A. Outline of responsibilities of each unit, individual, and group. B. Listing of problems encountered by each unit, individual, or group involved in the system.	Compare problems encountered with the list of responsibilities. Should be a determination of cause so the problem(s) can be eliminated.
C. Were curriculum coordinating committees or the executive council able to make appropriate decisions?	A. Minutes of meetings and decisions made. B. List of appropriate committee decisions. (Should be included in guidelines)	Compare committee decisions with the list of appropriate decisions.
D. Was there confusion as to responsibilities?	Interviews with individuals and groups involved in the system.	Summary of decision points where persons were unsure of who should make a decision.
2. Communications A. Was communication network set-up? Did it function properly?	Outline of lines of communication listing: A. Who reports what to whom. B. What is to be done with each report. --- List of reports made showing: A. To whom and when. B. Feedback and when.	Comparison of lines of communication as they were set-up and as they were actually used.
B. Was input from appropriate individuals, units, or groups obtained at appropriate times?	A. List contacts made, input, and when. B. List of individuals, units or groups with possible inputs.	List contacts, purpose, and inputs as a result of contacts. Compare with possible contacts.
C. Did all persons directly involved have an opportunity to be heard?	Minutes of meetings, planning sessions or work sessions, including a list of persons in attendance each time. Also, list decisions made, Actions taken.	Summarize actions taken, decisions made and who was present.

SYSTEMS EVALUATION TABLE

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
3. Were the materials developed and field-tested on schedule?	A. Proposed completion date B. Actual completion date C. Detailed list of problems encountered.	Comparison of proposed and actual completion dates. Evaluation of problems encountered.
4. Diffusion/Dissemination		
A. Did the diffusion system function properly?	A. Diffusion plans B. Diffusion activities and completion dates. C. Detailed list of problems encountered.	Compare plans and activities. Compare schedule with completion dates. Evaluate problems encountered.
B. Did dissemination system function properly?	A. Dissemination plans and schedule. B. Dissemination activities and completion dates. C. Detailed list of problems encountered.	Compare plans and activities. Compare schedule with completion dates. Evaluate problems encountered.
5. Did all phases (organization, operation, evaluation) of the systems function according to plan?	A. A summary of activities and products of each phase. B. Objectives of each phase.	Compare activities and products with objectives.

INFORMATION SHEET 011

Evaluation of the Curriculum Materials and Development Process

In order to evaluate the developmental process, each component of the process (i.e., objectives, learning activities, CRT's, reading level, etc.) must be examined to determine any errors or omissions. To aid in this evaluation, the three-column table on the next page may be used. In the first column, an evaluation question is stated for each component. The second column specifies the basic data needed to answer the questions. The third column suggests how to analyze the data to arrive at the answers.

A schedule for evaluation of curriculum materials should be developed by the executive council and the materials should be evaluated at regular intervals to determine any required or necessary revisions. This procedure will help to ensure that materials retain their validity.

Revision Cycle. The various evaluation processes will point out any flaws which exist within the materials. The type of error which exists will determine the necessary revision procedure which likewise will indicate the step within the CMS which one must return to in order to correct the error. Once measures have been taken to revise the materials, further evaluation will indicate if the error was corrected.

DEVELOPMENTAL EVALUATION TABLE — Information Sheet Con't.

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
1. Objectives A. Are the objectives appropriate to validated job tasks in the subject area. B. Are the objectives stated in behavioral terms? C. Are the objectives stated in terms easily understood by the students? D. Is the list of objectives complete?	A. List of validated tasks. B. List of objectives.	A. Compare objectives to tasks. B. Evaluate objectives.
2. Learning activities. A. Are the learning activities appropriate for the objectives? B. Are the learning activities developed in a sequential and hierarchical manner? C. Are appropriate resource materials available? D. Are the references listed in a manner that will enable the student to locate pertinent information?	A. List of objectives. B. Copies of resource materials. C. Copies of learning activities.	Compare objectives with resource materials and learning activities.
3. Student resource materials (manuals, etc.) A. Is the content accurate and appropriate	A. Pilot-test draft of materials. B. Evaluation of content by two or more content specialists. C. Evaluation of appropriateness by two or more teachers.	Teachers and content specialists should read the materials making note of any discrepancies or inaccuracies in the material. --- The evaluation should be followed by a conference of the teachers, content specialists and the curriculum staff.

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
3. continued A. continued		Following the conference a report of criticisms and proposed corrections should be sent to the curriculum committee and council for information purposes.
B. Is the reading level appropriate?	A. Pilot-test draft of materials. B. Evaluation by two or more teachers. C. A reading level estimating system (i.e. Graph for estimating readibility by Edward Fry, Rutgers University Reading Center, New Jersey)	Teachers comments concerning Reading level.
C. Is the format correct?	A. Pilot-test draft of materials B. Format outline.	Compare materials with format outline.
D. Is the content appropriate to objectives?	A. Pilot-test draft of materials. B. List of objectives.	Compare content with stated objectives.
4. Field test site. A. Was the selection of field test sites based on pre-determined criteria?	A. A list of criteria for field test sites. B. The qualification of each field test site.	Comparison of qualification with criteria.
B. Were field test teachers adequately trained and given adequate instructions?	A. An outline of instructions and training method. B. Teacher questionnaire related to field test procedures and problems. C. Inservice activities planned.	Compare analysis of instruction and training method with an analysis of the questionnaire response and activities planned.
5. Criterion Referenced Tests. A. Do the criterion test items relate to the objectives?	A. List of objectives. B. Criterion test items.	Compare objectives and test items. There should be two or more test items for each objective.
B. Did gain scores indicate significant gains in knowledge?	Pre and post-test answer sheets.	The answer sheets should be designed for machine grading. A computer program may be developed to accept information directly.

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
5. continued B. continued		from the answer sheets. Compute the t-test for related measures.
C. Did 85% of the students correctly answer 85% of the test items (or other similar criteria)	Post test scores	Compute percentages. The computer program should be designed to handle this.
D. Is the test reliable?	A. The questions most frequently missed on both pre and post tests. B. The questions that were seldom if ever missed. C. The incorrect responses that were selected. (the above items refer to multiple choice questions)	Item analysis. The computer should be designed to handle this.
E. Is the test easy to read and understand? F. Are the test items clear and to the point?		
6. Performance (skill) Test. A. Does the performance (skill) test measure appropriate skills? B. Are instructions and directions clear and easily understood by the students? C. Is the test compromised by unnecessary and excessive information? D. Are the skills being tested those that were taught? E. Were the necessary materials, tools, and equipment available to the student when tested? F. Were the tools and equipment in a good state of repair?	A. Performance test or check sheet. B. Performance objectives. C. Performance scores. D. A list of tools, equipment, and materials. E. A list of tools, equipment, and materials actually used in the skill test and a report of their state of repair. F. User evaluation of skills test (teachers and students). G. Copies of resource materials and study guides used to teach the skills.	At least two instructional area specialists should read the test for content and appropriateness, and time allowed to complete the test. (Timed tests may not always be appropriate). Compare the list of tools, materials, and equipment needed with those available. (Any that were not in a good state of repair should be considered "not available") (Performance scores are meaningful only if the above items are given high ratings. Unusually high or low performance scores require an evaluation of the entire procedure even if the above items are given high scores.

EVALUATION QUESTIONS	DATA NEEDED	ANALYSIS OF DATA
(Due to the possible variability of available equipment, several variations of a skill test should be constructed. Only field test sites with the appropriate equipment for teaching and testing the particular skills should be selected. Other variations of the skill test should be spot-checked for validity and reliability after the instructional material has been distributed.)		
7. Is the developmental process on schedule?	A. Time-line or PERT chart listing the stages to be completed and the dates or time allowed for each stage. B. A chart or listing indicating the beginning and ending date for each phase or stage. C. A list of problems that may have altered the schedule. D. Progress reports at predetermined times (including B and C above).	A comparison of the time-line with completion times. The list of problems encountered should be used to indicate causes and lead to a planning session for the purpose of eliminating the problems by developing alternative schedules.

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The Curriculum Development Process (as presented in The Mississippi Curriculum Coordinating Unit for Vocational Technical Education, James E. Wall, Assistant Dean R & D, College of Education, Mississippi State University, Jan. 1972).

Nature of the Process

To be fully appreciated in a curriculum development context, the term "process" needs to be operationally defined. The term PROCESS means a cycle of events established to accomplish desired results or ends; thus, it is "means to ends." Process is cyclical; its steps are recurring; it is perpetual, continuous, dynamic. Some steps are sequential: certain things should be done before another step is undertaken. However, many activities in a process can be conducted simultaneously; hence, flexibility is a necessary ingredient.

Systems View. People from various educational disciplines have formulated many different processes for curriculum development. Good curriculums are the result of dedicated and intelligent work conducted on a continuing basis. There is no official, standardized procedure for curriculum development. Probably the systems view (1:12), or systems approach (2:11-19) (3:172-175) offers more than any other single concept with respect to a way of dealing with complex problems and their changing relationships. The systems approach in curriculum development requires statements of performance objectives, continuous assessment of performance--the exercise of quality control--and adjustment for improvement, hence, the relationship to "cyclical" process. Banathy (1:14-15) indicates that the systems approach offers "a decision-making structure and a set of

decision-making strategies." He further indicates that the systems approach is not necessarily new, that it is "common sense by design." To a certain extent, this describes the process used by the Mississippi CCU.

Steps in Process

Embodied implicitly in the following process, which the CCU uses in its curriculum development work, are many of the aspects of the systems approach. Barlow (4:10) defines the curriculum as "the sum total of the learning experiences for which the school has responsibility." Furthermore, he states that "to plan a curriculum means to select, arrange, and sequence these experiences, through the joint decisions of teachers and learners, so that successful learning results."

1. Establish Priorities. Hence, the first step in the CCU curriculum development process is to establish priorities. This is accomplished through the use of special advisory committees comprised of CCU staff members, SDVTE personnel, teachers, teacher education personnel and representatives from appropriate businesses, industries, agricultural enterprises, and government agencies such as the employment service. In this step, the specification of the role for which training is to be provided is made. Bates (5) offers suggestions and techniques that are applicable to specification of the role. Vocational curriculums must be sensitive to the performance requirements of employers. They must be responsive to a relatively free labor market in which laws of supply and demand for marketable skills operate. No other curriculums are as radically affected by fluctuations in economic and related psychological and social conditions as are the vocational and technical education curriculums.

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It seems justified at this point to mention some of the precautions which should be kept in mind in using committees to establish priorities for curriculum development. The first precaution can be termed "specious persuasion." For example, a curricular concept or priority may be showy, or may take on a false guise of genuineness because of inaccurate data used to support it. Similarly, over-exuberance of a committee member may cause a curricular concept to take on a deceptive attraction or allure.

A second precaution relates to the unwillingness on the part of committee members to abandon publicly expressed opinions. Once expressed in the presence of committee members, a curriculum idea is seldom forgotten. It continues to crop up during ensuing discussions and may be inflated or distorted into becoming a false prime curriculum priority.

A third precaution relates to the bandwagon effect or what might appear to be majority opinion. For example, the status position held by a committee member who advances a potential curriculum priority may cause distortion of its significance. If he persists in advancing his idea, he may gradually gain support for it until the bandwagon effect begins to snowball to the point of overcommitment.

During discussions which result in establishing priorities for curriculum development, the tasks of a specified role are identified. Smith and Moss (6:2-4) indicate that tasks comprise the role, and that each task contains activities. All the tasks within the role should be identified insofar as possible. However, it is recognized that it would be extremely difficult to make a complete list of tasks for a role; nor would it be practical to teach all the tasks. Consequently, some type of task sampling frame should be used to determine the relevant tasks that would be ultimately incorporated into the curriculum.

Criteria for selection of the tasks to be taught, according to Smith and Moss (6:4-5) should be governed by the following: there must be sufficient time allocated for the role and time necessary to teach each task; (2) relevant tasks selected must be representative of the total task domain; (3) those tasks selected should be generalizable, which relate to "skill transferability"; (4) tasks should be those occurring most frequently in the role; (5) tasks should be selected based on their learning efficiency in the formal training program as opposed to learning them on the job; (6) tasks should be selected which have the lowest obsolescence rate; (7) tasks should be selected based on their learning efficiency in the formal training program as opposed to learning them on the job; and (8) tasks considered as prerequisites to the training program should not be selected.

2. Gather Materials. During and following the discussions included in establishing priorities, the CCU staff member begins to collect materials from many different sources, such as curriculum laboratories in other states, the ERIC system, etc., and makes judgement as to the completeness and representativeness of the materials. Invariably, materials are collected about which there was little or no prior knowledge.

3. Review Materials. The CCU staff member immerses himself completely in a study of these materials. Reading/research ability, concentration, and mental flexibility are essential in this step; and they permit adaptation of the curriculum coordinator in a wide variety of subject matter areas. In this step, he codifies and classifies materials for use in subsequent steps. He must have extensive, uninterrupted periods of time to develop sufficient insight to allow communication with authorities for translation of their counsel into the curriculum.

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4. Organizing materials. The curriculum coordinator convenes a curriculum committee (ad hoc) of teachers to begin organizing the material. At times this committee employs an occupational analysis as an instructional base. Frequently, the results of discussions held in the first step serve as input in this step. Attention is given in this step to formulating performance objectives using Mager's (7) format. Also used are the Objective Collections published by the Instructional Objectives Exchange (IOX), P.O. Box 24095, Los Angeles, California 90024, along with a mimeographed paper of instructions prepared by Popham (8). Armstrong's (9) handbook contains detailed instruction in writing objectives and in measurement of related variables, as well as exercises in critiquing objectives. A curriculum committee may use this handbook in a one-day workshop immediately prior to beginning the materials developed.

The objectives established in this step usually are considered as being tentative. Further refinement of them is made in subsequent steps in the process.

5. Compiling and Editing. This is probably the longest and most difficult step in the process. The most important work in this step is that of sequencing. Smith and Moss (6:6) conclude that sequencing "is a difficult problem that has not received the attention it warrants," and they suggest several approaches for consideration. For simple work roles, the instructional sequence might follow the work as it is performed on the job. For relatively unordered, interdependent tasks, the materials can be sequenced in line with proven demands of prerequisite competencies. For more complex work roles, task sequencing should follow development of a conceptual structure which permits inductive or deductive approaches in learning the work role. In addition, any or all of these sequencing

approaches may be used together. The vocational cooperative program offers an excellent opportunity to use all of these approaches in developing curriculums for that program.

In considering sequencing of materials, Banathy (1:59) indicates that "the learning of specific concepts should precede the learning of any principle comprised of these concepts. Problem solving cannot be attempted until the principles that are to be used in the solution of the problem are discovered or mastered." For example, a student cannot be expected to "trouble-shoot" an internal combustion engine until he has an understanding of principles of the ignition and fuel systems. The curriculum developer, therefore, should determine what must be known by the student in order for him to undertake the learning of a specific task. This calls for a hierarchical structuring of learning tasks. The elements of the curriculum, such as knowledge, skills, processes, and attitudes must be arranged and sequenced so that they can be presented through learning experiences to the student. Students are enabled to perform according to stated objectives after acquiring the content of the curriculum.

These learning sequences are then integrated into specific learning units. The units then are compiled into a document for editing. Careful editing is essential to yield a uniform format if the curriculum component is to be either printed, taped, or put in the form of a visual.

6. Authentication. Expert advice, opinion, and judgment is sought in this step to assure that technical information and processes are correct. Eight to twelve persons from business, industry, agriculture, etc., are selected from the field of specialty that is treated in the curriculum component. These persons are sent rough-draft copies or samples of the

curriculum component and charged with the responsibility of reviewing it in depth. A conference is then held during which these experts go over the curriculum component line-by-line. Their suggestions are used to revise the component. Past experiences reveal that virtually unlimited cooperation and assistance have been received from persons representing business, industry, agriculture, and their allied organizations.

7. Duplication. Sufficient copies are duplicated for each teacher of that subject field in the state, for teacher educators, and the SDVTE staff members. The CCU also makes copies of its materials available to curriculum development units in other states, on either a cost recovery basis or on a reciprocal basis.

8. Diffusion. Teachers need instruction for using new materials for the same reason that the physician or engineer needs instructions for using a new instrument or process. A curriculum component, no matter how well-planned or designed, will have educational value only to the extent that is used properly. For these reasons, curriculum development always must be accompanied by an in-service teacher-education program. CCU materials are diffused through workshops, using completed materials, involving all teachers, and showing what it is and how it is used. Such workshops also offer an opportunity for CCU staff members to gather invaluable "feedback" from the teachers.

9. Evaluation and Revision. A pragmatic point of view, intuition, and experience in teaching will always be useful to the curriculum developer, but we should demand research evidence of successfully designed curriculum components. The adequately designed curriculum will provide for monitoring, performance testing, etc., which point the way for subsequent revision and adjustment. Comprehensive evaluation will follow

the same systems approaches that were used to develop the curriculum. The purpose of the curriculum, its objectives, the subject matter, as well as those who teach it, will come under scrutiny in this step.

SUMMARY

Modern curriculum development requires the coordinated involvement of specialists in subject-matter, teaching technology, the social and psychological sciences, in administration and supervision, and the expertise found in all non-education areas. Comprehensive curriculum planning must be concerned with the total experiences of the student population, the adult and work roles he will assume, the efficiency of the instructional system, and the changing demands of the world of work. The systems approach to curriculum development seems to offer much in coping with these complex associations, relationships, and problems.

However, there seems to be a need for caution in the use of any curriculum development approach which might appear to be a panacea for all ills. New or revised curricula in vocational-technical education are being developed more rapidly today than ever before. We like to think they are in keeping with the rapidly changing world of work, but this may not be true in its totality. We may be over-reacting. The proliferation and variety of curricula seem to reflect the change and transience, or "temporariness," that characterize our society today. Their emergence is so rapid that in time the student's choice of a career, as well as the preparation route for it, may be seriously affected.

In developing numerous new curriculums in vocational-technical education, we run the risk of "over-choice"-- the point at which the

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advantages of diversity are cancelled by the ever-growing complexity of the student's career decision-making process. Relative high-speed appearance-disappearance of jobs, careers, and skills, along with greater complexity of choice, confront curriculum developers with the need to make increasingly rapid, frequently trivial, nevertheless highly influential decisions. The design of career education curricula should reflect the best methods of placing the student in a decision-making posture so that his choice of a career and the means of preparing for it are compatible. Such is the complexity of the work of curriculum developers.

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A Rationale for Curriculum Development (as presented in the publication, The Mississippi Curriculum Coordinating Unit for Vocational-Technical Education: Development and Functions by James E. Wall, Assistant Dean (R & D), College of Education, Mississippi State University, Jan. 1972.

In 1917, when the first significant vocational education legislation was passed, the Federal Board for Vocational Education maintained a relatively large staff to produce instructional materials. As the program throughout the nation expanded, teacher education and state departments began to assist individual teachers in producing their own materials. Materials were exchanged between teachers, between schools, and between states; but such exchanges were never formalized. Expanding enrollments coupled with the increasing complexities of vocational offerings began to demand an ever greater concentration and coordination of curriculum development practices. The need for specialization in well-defined curriculum areas became evident, and there began to emerge the semblance of curriculum development staffs in a few states. Today almost every state has at least one agency performing curriculum development tasks. Some states have two or more such agencies, each of which concentrates on some specific aspect of vocational-technical education.

Nationally recognized leaders in vocational-technical education indicate that curriculum development is now so complex that it demands national coordination. This is especially true with the current emphasis being placed on career education and its concomitant demands. Such national coordination is mandatory because of a number of impinging factors, among which are the following: (1) The states vary in their ability to provide a diversity of appropriate curriculum materials;

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(2) The potential for sericus problems to arise because of duplication of effort exists among the states; (3) There are innumerable occupational areas which must be served by vocational-technical and career education; (4) There are vast curriculum needs of special groups of people, especially the disadvantaged; (5) The necessity exists to continually update and revise curriculum materials; (6) Curriculum development must reflect the continued advances that are being made in educational media and technology; (7) There exists the tremendous need for the professional preparation of curriculum development specialists in vocational-technical and career education; (8) The growing quantity of vital information being made available to the field of vocational and career education should be reflected in the curricula; (9) Vocational-technical education curricula must take cognizance of the fact that the increasing geographical mobility of persons in the labor force seems to indicate the necessity for emphasis on standardization of certain types of comprehensive career education focusing on grade levels from kindergarten through 14 and/or continuing education gives rise to a need for curriculum development personnel who have highly specialized forms of expertise.

All of these factors which influence curriculum development in vocational-technical education, as well as others not mentioned above, must be placed in proper perspective. Balanced consideration of them can be accomplished only through a well-coordinated national structure which, as yet, has not been devised in a formal sense. But if and when such a national curriculum coordinating structure is created, it would no doubt have its various counterparts at the state level; and this is what we feel we have in the Mississippi CCU.

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A rationale for curriculum development in vocational-technical education would be incomplete without attention being paid to certain theoretical constructs. One of the most important theories which influences curriculum development is that of innovation diffusion. Among the many principles of innovation diffusion theory is that of involvement of people. Applied to curriculum development this means that those persons who ultimately will use, and be affected by, curriculum materials should be intensively involved in their development. Acceptance and use of materials are enhanced, and rejection is less, if local vocational education personnel take part in each step in the process of curriculum development, including that of priority establishment. Likewise, by involving local teachers, we are more likely to be able to make needed changes in the habit structure and behavior of local educational personnel.

The same principle dictates that business, industry, and other non-education personnel be used to help authenticate technical subject matter material included in curriculums. The use of such personnel brings to curriculum development other resources that are extra-educational, and which add other needed dimensions to the overall vocational-technical and career education efforts.

Another theory set apropos to vocational-technical education curriculum development lies in the realm of communication. Communication theory and techniques are vital to any program that is behaviorally oriented. Suffice it to say that, for the most part, educators have restricted themselves to talking and/or writing as the only means of communication. There is a need to identify and employ the great variety of communication techniques which have been perfected in fields other than

education. These techniques can be used to communicate ideas, feelings, and even occupational skills; and vocational-technical education curricula should reflect the knowledge of such techniques. Such techniques, coupled with modern educational media and technology, offer great promise in curriculum development.

Any listing of theories concerning curriculum development must of necessity contain some of the more appropriate principles of learning theory. An example can be used here to show that one learning theory principle tends to center around the over-used term relevance. For instance, we in vocational-technical education believe strongly that learning in our field should be based on direct experience. Education in all areas of vocational-technical education has a reality dimension; i.e., we use actual materials, hands on machine processes, industrial and business organization, farm and home projects and enterprises, shop and laboratory experimentation, etc., in our teaching. In essence then, learning in these areas is relevant. Probably cooperative education is the best example of how to make education relevant or real.

There are other principles of learning which have an impact on curriculum development in vocational-technical education. For instance, Robert Travers (1:525-558) points out that curriculum development requires research for development of learning theory along three lines: (1) a theory or concept of learning that specifies the conditions under which learning takes place most effectively; (2) a body of empirical laws that permits the evaluation of specific educational materials and procedures for achieving specific objectives; and (3) a system of values that determines the direction in which learning is to occur. Intertwined in these

are the need for and nature of (1) behaviorally stated objectives, (2) sequencing or phasing of instruction, and (3) continuous evaluation in the curriculum development process.

In summary, a rationale for curriculum development requires consideration of at least the following: (1) the subject matter and its inherent logic must be kept in mind by the curriculum coordinator or designer/developer; (2) the learning process must be made efficient; (3) the potentiality for transfer of training must be increased; (4) the precision and objectivity of thought/reasoning must be heightened; (5) problem-solving/decision-making strategies must be imparted; (6) motivation for continuing desire to learn should be established; and (7) procedures for measuring and diagnosing the outcomes of learning must be continuous, and they must continually be improved.

Study of the foregoing rationale reveals that we must constantly focus and refocus upon teacher education if our curriculum development activities are to be successful. Since most of the important changes that seem desirable in education must be implemented by teachers, changing the way they are educated should have a direct effect on educational change. But the rigidity characterizing some of our teacher education curriculum has tended to retard the rate of change that takes place in local schools, because the teachers we supply the schools with are ill-equipped to play the change-agent role.

Finally, in order to enhance curriculum development efforts and to be somewhat more comprehensive in our considerations, it seems worthwhile to cite eight imperatives regarded as crucial by Swanson, Nelson, and Meyer (2:22-24) to the interpretation and implementation of a modern

concept of vocational-technical and career education curriculums. They indicate that it is imperative (1) that education programs make provision for occupational instruction for all students, irrespective of their future goals; (2) that the first goal of vocational programs be to equip students with salable skills, intellectual and manipulative, and to give them a base of occupational experience that will add relevance and adaptability to their vocational goal achievement; (3) that maximum effort be given to curriculum development which can accelerate the rate of skill achievement and retard the rate of skill obsolescence; (4) that vocational education provide experiences which will help the student to identify his talents, to relate those talents to the world of work, to identify an occupational interest, and to develop such talents as will widen his choices and improve the skills required for success; (5) that curriculum innovators determine what and how much generalized vocational preparation and specialized vocational preparation will make a graduate employable in the current and future job market; (6) that competence to enter the job be held as the minimum requisite for graduation and that eligibility for placement be regarded as the minimum completion requirement; (7) that the vocational curriculum satisfy the needs of learners in their vocational development as well as the needs of employers in their competitively productive environments, with the ultimate goal of producing competent, well-adjusted workers and citizens; and (8) that curriculum developers engage in research to determine the most effective and efficient programs for preparing individuals for occupational employment.

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TOPIC F: Standard Characteristics for Vocational Education Programs

CURRICULUM STANDARDS

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Traditional vocational education curriculums have related to only a small portion of the overall learning process, the skill acquisition portion. Currently, however, curriculum developers are utilizing a more coordinated systems approach in the preparation of instructional materials. This approach includes at least minimal components in the systems. These system components are directed toward increasing the learning effectiveness of curriculums and their instructional materials. They also are directed toward a consideration of the quality of life that a person might live as a result of acquiring and applying work skills.

Any statement concerning curriculum standards must be preceded by a few important characteristics which the standards should possess. The standards should be broad enough to cover all aspects of the concept curriculum. Simultaneously the standards statement should address the basic factors in curriculum, i. e., assessment to determine curriculum needs, development and testing of instructional materials, implementation or installization of materials, and evaluation and follow-up to determine learning effectiveness and to obtain data for curriculum revision and/or new offerings. Curriculums that are developed on this type of foundation will possess a maximum of flexibility. Such flexibility will cause them to be more transportable than materials not so characterized.

With the above general comments in mind, attention is focused on specific standards. Standards 1, 2, and 3 are concerned with needs assessment.

1. Curricular offerings should be based on a thorough analysis of occupational patterns and trends, business-industrial-agricultural trends, community and/or state development trends, and population shifts and changes in composition. Decisions about curricular offerings should be influenced by a wide variety of citizen/worker groups, councils, and committees. The emphasis should be on people involvement.
2. Curricular offerings should be influenced by students and/or trainees--their goals, aptitudes, interests, ability levels, socio-economic characteristics, and their present and projected enrollment numbers, curricular offerings should be integrated with supporting services including other educational subjects, social services, guidance and counseling services, financial aid and support, remedial education, etc.
3. Curriculums, while oriented to individual needs of diverse groups, should strive to integrate "special needs" persons into regular programs insofar as is feasible and practical. This standard will be easier to achieve if curriculum materials are developed in an individualized instruction format.

Standards 4, 5, 6, 7, and 8 deal with curriculum materials development.

4. Curriculum development should be based on a set of national standards which provide uniformity of procedural steps, style, and format. Such standards, once adopted by curriculum laboratories and centers across the nation, would go far in enhancing the transportability of materials. The National Network for Curriculum Coordination in Vocational-Technical

Education has as one of its long-range goals that of deriving a set of national standards for curriculum development.

5. The curriculum development process should contain as a minimum the following steps: (1) conduct feasibility study of all available data; (2) conduct task analysis; (3) develop performance objectives; (4) develop criterion-referenced measures; (5) validate criterion-referenced measures; (6) validate performance objectives; (7) develop learning sequence; (8) develop learning strategies; (9) develop modules-units-lessons; (10) validate modules; (11) implement and field test the system; (12) follow-up graduates or evaluate. By following a process similar to that cited above, curriculum products would possess certain built-in guarantees of quality and learning effectiveness. The curriculum products would be more apt to (1) prepare persons for successful entry and advancement in employment; (2) be relevant to changing social, economic, and technological conditions; (3) provide successful participation as a citizen in our society; (4) provide required basic general education; and (5) meet the needs of diverse student groups.
6. Curriculums should be designed to encourage students to learn to make decisions, and to be responsible for their choices. Decision-making is probably the most important process a student will ever learn. Although difficult to integrate into the curriculum, decision-making is basic to advancement potential in any career.
7. Curriculums should be designed in an individualized instructional mode to enhance the monitoring of student progress and to aid in vertical and horizontal progression through sets of curriculum modules or lessons. Several advantages can be attributed to the individualized instruction concept. These are (1) each student makes continuous progress toward

mastery of instructional content; (2) every student continues to mastery of content at his own rate; (3) every student is engaged in the learning process through active involvement; (4) the student views the learning process as primarily self-directed; (5) every student is able to evaluate the quality, extent, and rapidity of his progress toward mastery of successive areas of the learning continuum; (6) the student develops a favorable attitude toward school and learning in general; (7) the student may develop interest in specific academic and/or vocational subjects; (8) the student manifests increased motivation toward vocational and related academic subjects; and (9) different students work with different learning materials adapted to individual needs and learning styles.

8. Curriculum content should be based on research into job/task analysis which would involve incumbent workers and their supervisors. The research model used by the Vocational-Technical Education Consortium of States is an excellent example of "front-end" analysis of tasks in a job domain. It allows for periodic up-dating as new tasks emerge for given jobs.

   Standards 9 and 10 deal with curriculum dissemination and implementation.

9. Curriculum dissemination and diffusion could be enhanced through increased support for and maximum use of the National Network for Curriculum Coordination in Vocational-Technical Education (NNCCV-TE). The NNCCV-TE is composed of six regional curriculum coordination centers, with each center having 6 to 12 affiliated states and Trust Territories.

10. Curriculum packages intended for widespread use should contain appropriate information that would aid in adoption, adaptation, and installization. Such information should include details of the development process, validation procedures, field-test results, needed in-service training of staff, and other suggestions which might prove helpful in implementing the curriculum.

    Standard 11 deals with curriculum research and evaluation.

11. Portions of the resources currently existing in the state Research Coordinating Units should be used in improving and expanding curriculum research and evaluation. Some RCU resources and staff expertise may be used in determining curriculum offerings by analyzing data accumulated in management information systems. Similarly, RCU resources might be brought to bear on curriculum data storage and retrieval and information dissemination.

Curriculum is a major aspect of vocational education. As such it warrants increased support. Curriculum is the vehicle through which <u>all</u> vocational education decisions are carried out, no matter what level at which the decisions are made. Any decision made sooner or later will ultimately impact on the teaching/learning environment---the point at which curriculum purposes are manifested.

APPENDICES

Appendix A:

Sample Evaluation System to Use in Conjunction with

or as a Subcomponent of the CMS

The chart on the next page represents a CIPP approach to the CMS model. In order to understand this approach, one should note that, there are three major steps involved in a CIPP evaluation. These are:

1. Delineating information - The focus is put on information required by the decision makers.
2. Obtaining information - The data in (1) above is collected and analyzed.
3. Providing - The material in (2) above is put into a useful form to the decision maker.

Context	Input	Process	Product
Objective: 1. define the environment where change is to occur 2. determine environment's unmet needs 3. identify problem's underlying needs Identify and define: 1. the major subsystems of the domain to be served 2. the unmet needs in the domain through an assessment of the discrepancies among intended and actual outputs 3. the basic causal problem underlying each need Provides information for deciding upon the setting to be served, the goals associated with meeting needs, and the objectives associated with solving problems.	Identify and assess: 1. relevant capabilities of responsible agency. 2. strategies for achieving project objectives 3. designs for implementing a selected strategy Assess alternative designs in terms of: 1. resource, time and budget requirements 2. potential procedural barriers, the consequences of not overcoming these barriers, the possibilities and costs of overcoming barriers. 3. overall potential of the design to meet project objectives Provides information for deciding 1)whether outside assistance should be sought, 2)what strategy should be employed(e.g. the adoption of available solutions or the development of new ones), and 3) what design or procedural plan should be employed for implementing the selected strategy. Decisions based on input eval. usually result in the specification of procedures, schedule staff requirements and budget	Objectives: 1. detect or predict defects in the procedural design or its implementation stages. 2. provide information for programmed decisions 3. maintain a record of the procedure as it occurs Essential features 1. full time process evaluator 2. instruments for describing the process 3. regular feedback meetings between process evaluator and project personnel 4. frequent updating of the process evaluation design Process evaluation provides project decision makers with information needed for anticipating and overcoming procedural difficulties, for making preprogrammed decisions, and interpreting project outcomes. Strategy-identify and monitor, on a continuous, molar, non-interventionist basis, the potential sources of failure in a project. Information collected daily, organized systematically, analyzed periodically and reported as often as project personnel require such information.	Objective: Relate outcomes to objectives and to context and input to measure and interpret outcomes Includes: 1. devising operational definitions of objectives 2. measuring criteria associated with the objectives of the activity 3. comparing these measurements with predetermined absolute or relative standards, and 4. making rational interpretations of the outcomes using the recorded context input, and process information.

CONTENT Determine What Needs to be Done	INPUT Determine What Resources Are Needed (Available?) to Do the Job
Curriculum Development	
1. Needs assessment -Goals and objectives	a. Curriculum coordinating unit and staff b. Service area supervisor and staff c. Survey instruments and procedure d. Objective method of determining priorities e. Computer analysis of data f. Service area curriculum coordinating committees g. Budget
2. Product development or acquisition -Goals and objectives	a. Service area curriculum coordinating committee b. Product review criteria and procedures c. Curriculum coordinating unit and staff d. Curriculum samples acquisition procedure e. Curriculum development f. Service area supervisors g. Field test procedures h. Budget
3. Product diffusion/dissemination	a. Communications network b. Service area supervisors c. Curriculum coordinating unit and staff d. Production, storage, and delivery facilities e. Field test teachers and/or curriculum staff f. Budget
(Determine how the product should look and what it should be able to do. Be specific in the development of criteria. Determine conditions, who is to be served, desired ends.	(Resource needs are carefully analyzed to be sure each one is in place. Determine capabilities of resources and whether outside help is needed. Can we do the job? What additional staff is needed? Do we need outside help? Determine means of developing the product.)

PROCESS Determine how the job is to be done.	PRODUCT Determine what was done.
Curriculum Staff develop instruments and objective method of determining priorities. Also analyze data. Service area supervisor and staff conduct needs assessment according to procedure developed through cooperative efforts with the coordinating unit. Service area curriculum coordinating committee review needs and determine course(s) to be developed. Regular reports to the evaluator.	Instruments developed and field tested Data analysis program developed Formula for prioritizing courses Needs assessment procedure developed Committee review procedure developed
Curriculum Staff develop review criteria and procedures. Obtain samples of curriculum materials from other sources. Service area curriculum coordinating committee review curriculum materials from other sources and determine whether to adopt/adapt or develop. Curriculum Staff develop RFP or contract for solution Curriculum staff develop materials and field test. Curriculum Staff develop field test procedure and analyze data. Regular reports	Field tested curriculum for selected course(s)
Service area supervisors, inform teachers of new curriculum materials. Hold in-service and informational meetings to allow teachers opportunity to view materials and discuss with developers and/or field test teachers. Survey teachers as to interest in adopting. Curriculum Staff set up production, storage and delivery. Coordinate with diffusion activities of supervisors.	Curriculum materials installed in classrooms.
(Each step and activity should be carefully documented. Problems are immediately confronted and decisions made. Process evaluation determines decision points and evaluates the process of developing the product. Formative evaluation. Data collection and analysis.)	(The context goals and objectives are the criteria for evaluation of the product. Product evaluation will indicate whether the product meets the criteria. Process evaluation will indicate whether or not the process was at fault if the product fails to meet the criteria. Summative evaluation.)

Appendix B:

Example of an RFP

REQUEST FOR PROPOSAL (RFP)

FOR

A SELF-PACED COMPETENCY BASED CURRICULUM FOR THE SECONDARY LEVEL ELECTRO-MECHANICAL CLUSTER AND A POST-SECONDARY AIR-CONDITIONING PROGRAM

ISSUED BY

RESEARCH COORDINATING UNIT
DIVISION OF PROGRAM DEVELOPMENT
GEORGIA DEPARTMENT OF EDUCATION
ROOM 333, STATE OFFICE BUILDING
ATLANTA, GEORGIA 30334

July, 1978

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REQUEST FOR PROPOSAL (RFP)

Agency Issuing RFP: The Georgia State Board of Education is requesting proposals for the development of self-paced competency based curriculum for the secondary level Electro-Mechanical Cluster and the post-secondary Air-Conditioning and Heating Programs.

Eligible Applicants: Educational agencies, institutions of higher learning, public or private consulting agencies or firms, and other agencies or firms interested in developing proposals.

Project Duration: Not to exceed 18 months.

Dates of Activity: This project will begin September 15, 1978, and conclude February 15, 1980.

Schedule for Proposals: Six copies of proposals should be mailed or delivered to the attention of Mr. John H. Lloyd, Director, Program Development Division, Office of Vocational Education, 333 State Office Building, Atlanta, Georgia 30334, on or before 5:00 p.m., August 21, 1978. Questions regarding the proposal should be directed to Mr. John Lloyd, telephone number (404) 656-2547.

Assurances: Each proposal will be subject to the assurances indicated on Attachment "A."

Funds Available: Project funds will not exceed $85,000.00.

Activity Goals:

1. To modify and update existing secondary electro-mechanical curriculum materials.
2. To develop new secondary level electro-mechanical curriculum materials.
3. To develop a one-year post-secondary air-conditioning and heating curriculum.
4. To articulate materials to ease transition from secondary to post-secondary levels.
5. To field test all materials.

Rationale for Activity: There is a need to develop curriculum and instructional materials to support the post-secondary Heating and Air Conditioning Program, and the associated secondary Electro-Mechanical Cluster are not complete and are designed around the P.L.A.C.E. format. The post-secondary Air-conditioning and Heating Program has become outdated and contains frequent references to commercially developed literature and audio-visual

training materials that are no longer available for purchase. The existing secondary cluster and post-secondary curriculum were developed separately and do not provide for a continuous progression of instruction from the secondary to post-secondary levels. Also, recent developments in the air-conditioning and heating fields render portions of the existing and heating fields rials obsolete.

Specific Objectives:

1. Conduct a search of available related literature, including ERIC and equipment manufacturers.
2. Analyze the occupational skills required in the electro-mechanical area as they relate to the air-conditioning and heating field.
3. Identify, validate, and sequence the continuum of job tasks required form the electro-mechanical cluster through the air-conditioning and heating program. (To be approved by C.A.P. Committee)
4. Develop performance objectives and criterion referenced measures.
5. Identify learning activities and design instructional modules for each task or subtask.
6. Field test materials utilizing students enrolled in comparable vocational courses. Make changes and corrections as required.
7. Complete and deliver the necessary student curriculum materials to teach a 750 clock hour electro-mechanical cluster and a four quarter, 1248 clock hour post-secondary air-conditioning and heating program.
8. Develop and deliver teachers manuals complete with suggested instructional strategies, student motivational suggestions, solutions to all student exercises and applications, and also, teacher checkpoint activities.

Minimum Requirements and Specifications:

1. The post-secondary individualized instruction format will be used throughout the total program. (Format to be provided by Vocational Media Center Coordinator.)
2. The deliverable products will include all instructional materials necessary to implement a self-paced program of instruction.
3. V'TECS catalogs will be used where appropriate.
4. The secondary electro-mechanical cluster materials will provide for a minimum of 750 clock hours of instruction (to include lab experiences).
5. The post-secondary air-conditioning and heating materials will provide for a minimum of 1248 clock hours of instruction (to include lab experiences)

6. Teachers' manuals will be developed that contain operational and management instructions, motivational suggestions, alternate student projects, instructor check information, student evaluations, pre-test, post-test and self-check information.
7. All audio-visuals development will be included in the project. Any proposed commercially available audio-visuals will be approved by the State Vocational Media Center Coordinator.
8. Deliverable products include camera-ready written materials and audio-visual masters approved by the State Vocational Media Center Coordinator.
9. The Curriculum Articulation Project (C.A.P.) committee will serve as a review committee for the project and will periodically meet with contractor and make recommendations.
10. All instructional units will meet the minimum specifications for a vocational learning unit as identified by the State Vocational Media Center. (Attachment "B")
11. A minimum of 100 learning units will be developed for the Electro-Mechanical Cluster.
12. A minimum of 250 learning units will be developed for the post-secondary Air-Conditioning and Heating Program.
13. Quarterly reviews will be held with the contractor to determine progress, resolve questions, and provide technical assistance.
14. Reading references shall be keyed to the textbook(s) most frequently used by the vocational schools and/or to manufacturers manuals frequently used by incumbent workers.
15. Practical exercises and applications shall be keyed to the type of instructional equipment most frequently used in the vocational schools.

Plan for Accomplishing Objectives: The proposer should submit a comprehensive plan outlining objectives, procedures, sources of data, specifications, activities, timelines, etc. Essentially, this plan should indicate how the proposer will proceed in the accomplishment of the project. The proposal shall include an overall project design. The design shall describe the specific procedures by which each objective will be accomplished.

Management Plan: The proposal shall describe the way in which personnel and resources will be used to accomplish the objectives. The application shall also contain:

1. The names and qualifications of the project director, key professional staff, advisory groups, and staff.
2. Time commitments planned for the project by the project director, key staff, advisory groups, consultants, and others.
3. Identification of the use of professional staff members from minorities or women where appropriate.
4. Description of how this project or the proposed results, outcomes, or end products may contribute toward the elimination of sex discrimination, sex bias and/or sex role stereotyping.

Evaluation:

The proposal shall contain the plan to be used for evaluation of the project by the contractor. Also, the proposal shall include a detailed plan for the evaluation and field testing of the instructional modules.

The SDE Project Coordinator will meet with the contractor at least every 90 days to evaluate progress. Also, a third party evaluation team will be scheduled to conduct an evaluation upon conclusion of the project and make a written report to the SDE on their findings and recommendations.

Results:

The contractor will submit a written report quarterly, indicating progress toward each objective. Also, a final written report will be filed within thirty days after the conclusion of the project.

Staff Competency:

The proposal should specify the staff to be assigned, qualifications and percentage of time to be devoted to the project. Specific qualifications relating to the development of vocational individualized instruction should be noted.

The proposal shall provide a justifiable and itemized statement of costs which is substantiated by line items in the proposed budget and the cost effective with respect to the proposed results, products, and outcomes.

A budget summary shall be submitted with funds identifiable by the following categories.

1. Salaries
2. Employee benefits
3. Travel (in accordance with State Travel Regulations)

4. Supplies
5. Printing
6. Other specific costs

The budget summary shall be signed by the project director and the institutional/agency finance officer.

Schedule of Payments: The contractor may submit requisitions monthly covering expenses incurred during that period. Ten percent of the project funds will be withheld until all products are accepted and delivered.

Deliverable Items: The contractor will furnish the following:

1. One camera-ready master for all written materials, including student materials and teacher guides.
2. Twenty sets of reproduced student written materials.
3. Two sets of reproduced teacher guides.
4. One set of original slides and audio tapes suitable for use as masters.
5. Two sets of reproduced audio-visuals.
6. A script/story board for audio-visuals.
7. A complete bibliography or references and sources utilized.

All items will be deliverable on or before the project termination date. Final draft approval by the Vocational Media Center must be granted on all deliverable items at least thirty days prior to the project termination date.

Proposal Evaluation: All proposals will be evaluated by a reading committee appointed by the Division of Program Development, Office of Vocational Education. Evaluation criteria will be as follows: Plan for accomplishing objectives 35, Management plan 20, Evaluation 15, Staff Competency 15, Budget 15.

Notification of Action: All proposers will receive a written notification of the results of the proposal evaluation within thirty days of submitting the proposal.

ATTACHMENT "A"

ASSURANCES

1. The applicant has the necessary legal authority to apply for and receive the proposed contract. The proposal is signed by the person(s) legally capable of consenting to an agreement.

2. The applicant will comply with the provisions of Title VI, Civil Rights Act of 1964 (P.L. 88-352) and regulations of the Department of Health, Education and Welfare pertaining thereto (45 CFR Part 80), to the end that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the applicant receives federal financial assistance from the Department of Education.

3. The applicant will comply with the provisions of Title IX of the Education Amendments of 1972 (20 U.S.C., Section 1681 et. seq.) and the regulations promulgated thereunder by the Department of Health, Education and Welfare, insofar as applicable hereto.

4. The contract (project) will be conducted in compliance with all applicable state and federal laws and policies and procedures of the State Board of Education of Georgia, including submission of such reports as may be required.

5. The applicant will comply with the minimum wage and maximum hours provisions of the Federal Fair Labor Standards Act, as they apply to hospital and educational institution employees of state and local governments.

6. The applicant will establish safeguards to prohibit employees from using their positions for a purpose that is or gives the appearance of being motivated by a desire for private gain for themselves or others, particularly those with whom they have family, business, or other ties.

7. The applicant will comply with applicable standards and regulations of the Cost of Living Council in establishing wages and prices. The applicant understands that submission of a bid, or offer or the submittal of an invoice, or voucher for property, goods or services furnished under a contract, or agreement with the State Board of Education shall constitute a certification that amounts to be paid, do not exceed maximum allowable levels authorized by the Cost of Living Council regulations or standards.

8. All data collection activities to be carried out under this proposed contract will have the prior approval of the Director, Research Coordinating Unit.

9. For contracts and subgrants in excess of $100,000 applicants will comply with applicable standards, orders, or regulations issued pursuant to the Clean Air Act of 1970, as amended (42 U.S.C. 1857b, et. seq.).

10. The applicant agrees that for any contract or grant in excess of $2,500, the same assurances as agreed to herein shall be required of any subcontractor or subgrantee.

11. The applicant will not enter into an agreement or contract with a subcontractor or subgrantee without the advance written approval of the Director, Research Coordinating Unit.

DATE	APPLICANT

APPLICANT MAILING ADDRESS

ATTACHMENT "B"

SPECIFICATIONS AND GUIDELINES FOR
INDIVIDUALIZED VOCATIONAL "LEARNING UNITS"

1. A learning unit contains student learning activities that provide for mastery of the knowledge and skills (cognitive, psychomotor, and affective) necessary to successfully perform a specific task.

2. All learning units shall be designed to accomplish a specified performance objective.

3. All learning units will contain a minimum of three different learning activities to include written materials, practical application and instructor checkpoint activities.

4. At least 75% of learning units will contain audio-visuals.

5. Written materials will be selected to provide students with specific information necessary to perform the next learning activity.

6. No more than two full pages of reading materials will be selected for a single learning activity.

7. Written materials will not exceed a standard eighth grade reading level.

8. Copyrighted materials contained as an integral part of a learning unit will not be used except with written permission of the copyright holder.

9. Audio-visuals will consist of 35mm slides and standard cassette tapes. Slide masters are to be made from Ektachrome E-6 process type film.

10. Audio-visuals will be incorporated in a learning unit to (a) supplement existing materials; (b) simplify complex procedures and/or concepts; (c) to integrate material; (d) review or summarize material; and, (e) motivational purposes.

11. Audio-visual packages shall contain a minimum of ten frames (slides) and a maximum of 80 frames.

12. Audio-visual packages shall contain a minimum duration of ten minutes and a maximum duration of thirty minutes.

13. Audio for each frame should range from a minimum of five seconds to a maximum of 45 seconds.

14. All audio-visuals shall be narrated and programmed to advance the Singer caramate projector.

15. The State Department of Education Logo will be used on all title slides.

16. A-V packages shall not intermix horizontal and vertical slide formats.

17. Reading assignments by text and page number should be included on a text assignment sheet. The unit sheet should include a reference to the text assignment.

18. Job sheets, information sheets, operation sheets, and assignment sheets, as appropriate, should be included with the unit sheet.

19. Instructor checkpoints are provided for purposes of (1) determination if student understands material; (2) safety; (3) instructor demonstration; (4) observation; (5) performance evaluation; (6) clarification or explanation of complex material; (7) motivation and encouragement.

20. The function of the instructor checkpoint should be indicated on the student unit sheet. The instructor's guide should provide details on instructor activity at each checkpoint.

21. A criterion referenced test will be developed for each unit of instruction. Test administration and interpretation will be included in the instructor's guide.

22. All written tests or evaluations shall not be contained in student materials.

23. Each instructional unit should be designed with student motivation in mind. This may involve a change of pace, variety of learning activities, use of audio-visuals, early introduction to practical applications, small group activities, etc.

24. All learning units shall contain practical applications. The student will be scheduled for "hands-on" experiences as early as possible. Learning activities should be alternated among written materials, audio-visuals, instructor checkpoints, and practical applications.

25. Practical applications may consist of the following student activities: (1) operation of machines and equipment; (b) experiments/operations on training aids, or mock-ups; (c) project involving various tools and equipment; (d) live work (involving trouble shooting, repair or construction); (e) projects involving calculations, blueprints, or research; and, (f) other appropriate practical applications as performed by the incumbent worker.

26. A minimum of 75% of student learning activities shall be devoted to practical applications.

27. Instructions or procedures for a practical application may be derived from the following: (a) equipment manufacturers reference manual; (b) laboratory manual; (c) audio-visual presentation; (d) instructor demonstration; (e) operation sheet; (f) job sheet; (g) observation of advanced student; or (h) any combination of the above.

ATTACHMENT "B" - SPECIFICATIONS AND GUIDELINES
FOR INDIVIDUALIZED VOCATIONAL "LEARNING UNITS" (con't)

28. All camera ready materials will be typed with Courier 72, 10 characters per inch ball, IBM Tech III ribbon or equivalent.

29. An estimated time for student completion (in hours), based on field test results, shall be included on each unit sheet.

1. AV's - Audiovisuals. Most frequently referring to 35mm slides and cassette tapes in this document. May refer to any picture and/or sound media.

2. C.A.P. - Acronym for Curriculum Articulation Project. A committee of instructors will be appointed for each instructional program to assist in identifying and sequencing tasks in order to facilitate student mobility from secondary to post-secondary.

3. Checkpoint - A student-instructor interface point wherein the instructor may give the student a test, perform a demonstration, or simply provide the student with additional needed information or instructions. Also, a checkpoint may be used for motivational purposes.

4. Criterion-Referenced Measure - An exercise based upon a performance objective, the accomplishment of which measures attainment of that objective.

5. Duty - One of the distinct major activities involved in the work performed, comprising related tasks.

6. "Hands-on" - Statement implying the student is physically doing something. Most frequently used to refer to projects involving tools, equipment and the like.

7. I.I. - Abbreviation for individualized instruction.

8. Instructor Guide - Instructor materials which convey all the necessary information for managing and/or examining student checkpoints. Some times referred to as "Teacher's Guide(s)."

9. Job - The duties and tasks actually performed by a specific individual.

10. Job Sheet - (Or Operations Sheet) - A project of a performance nature. Generally performed by the student in a lab or shop type environment or in a specialized work area.

11. Live Work - Generally refers to items brought into the course area for repair or adjustment. Examples of live work might be automobiles, radios and TV's, air-conditioners, etc. Another form of live work would be patrons visiting the cosmetology department to receive permanents or other services.

12. Master Copies - Original copies of slides, tapes or written materials set aside for the purpose of duplication.

13. Occupational Inventory - A listing of tasks to be performed in a particular occupational area, grouped under duty classifications.

14. Open-Entry - Term meaning that a student may enter the program at any time and does not have to wait for quarter or semester breaks.

15. Open-Exit - Term meaning that a student may leave a course any time he/she completes the planned course objectives.

GLOSSARY OF TERMS (con't)

16. Performance Guide - A series of steps, arranged in a sequence ordinarily followed, which when completed may result in the performance of a task. Also called "teaching steps."

17. Performance Objective - A statement in precise, measurable terms of a particular behavior to be exhibited by a learner under specified conditions. It possesses each of the elements or characteristics specified below:

    a. Condition - The testing situation confronting the learner is clearly specified. This includes equipment provided or withheld, environmental constraints such as temperature, space, etc.

    b. Performance - The specific behavior expected of the learner is stated.

    c. Standard - The degree of acceptable performance is specified. This may be quantitative, qualitative, or both. If quantitative, 100% proficiency is assumed unless otherwise stated. In the standard, "...locate shorts in an ignition system," it is assumed that all shorts must be located, compared to "...locate 3 of 4 shorts existing in an ignition system." If qualitative, the standard is explicity stated, e.g., "...measure the bearing to within .005 of that found by the instructor." If the measure of quality is highly subjective, the instructor is assumed to be the judge of acceptable performance unless otherwise stated. This judgment may be made using a checklist, or it may be strictly a "go, no-go" decision.

18. Performance Test - A test entailing not only the ability to answer questions, but measuring the students' ability to operate, manipulate, or perform a given task as well.

19. Self-Paced - Refers to a student moving through the prescribed training program at the fastest pace at which the student can meaningfully learn.

20. Sequencing -Putting any set of series of learning activities into proper order or sequence. Normally arranged from the simple to complex within groupings or blocks.

21. S.D.E. - State Department of Education.

22. Software - Written or printed materials.

23. Storyboard - A method of displaying both visual and verbal content of an AV. The "storyboard" is normally laid out in proper sequence for the AV developer to see and evaluate the proposed sequence and content of the AV being developed.

24. Task - One basic operation, process, skill, or knowledge element for which an individual would be paid for performing or knowing, if used in industry or actual employment.

25. Task Analysis - A process of reviewing actual job content and context in business and industry for application to the development of performance objectives, criterion-referenced measures, and quality control within a program of vocational-technical education.

26. Task List - A listing of tasks performed by incumbent workers within a domain of interest. An example is a listing of all tasks performed by an automotive mechanic or by a worker in ornamental horticulture.

27. Unit - One "module" of I.I. training materials; generally covering one learning task and programmed on one Unit Sheet (see the following definition). Sometimes thought of as a single "lesson."

28. Unit Sheet (or Flow Chart) - The guide sheet or "road map" used by students to find out the sequence of learning activities they must follow to complete the unit they are studying. Also, the Unit Sheet specifies the type of learning assignment for each activity, i.e., Reading Assignment, Lab Assignment, Audiovisual, Instructor Checkpoint, etc.

29. Validate - The process of evaluating a learning package through actual usage by the teacher and students to determine the program's effectiveness.

30. V'TECS Catalog - A comprehensive collection of performance objectives, performance guides, criterion-referenced measures, and related data, organized by a job structure or career ladder within a domain of interest.

THE UNIVERSITY OF GEORGIA
COLLEGE OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
VOCATIONAL EDUCATION MATERIALS CENTER
GREEN STREET
ATHENS, GEORGIA 30602

AGRICULTURAL EDUCATION
BUSINESS AND OFFICE EDUCATION
DISTRIBUTIVE EDUCATION
HEALTH OCCUPATIONS EDUCATION
HOME ECONOMICS EDUCATION
INDUSTRIAL ARTS EDUCATION
TRADE AND INDUSTRIAL EDUCATION
VOCATIONAL EDUCATION MATERIALS CENTER

October 9, 1978

M E M O R A N D U M

TO: Ms. Mary Harville, State Project Office

FROM: G. L. O'Kelley, Jr.: Chairman, Division of Vocational Education

SUBJECT: For USOE Project C651

Please find attached a copy of the fourth quarterly report for project number C651, Grant number G007701962.

Your idea and suggestions are always appreciated. Let us know what you are thinking in regard to the project.

GLO/ds

Attachment.

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION INSTITUTION

QUARTERLY REPORT

Project No. C651
Grant No. G007701962

Dr. George O'Kelley, Project Director
Dr. Paul Scott, Project Coordinator
The Division of Vocational Education
College of Education
The University of Georgia

THE DEVELOPMENT AND TESTING OF A STATEWIDE MULTILEVEL CURRICULUM MANAGEMENT SYSTEM FOR GEORGIA VOCATIONAL EDUCATION PROGRAMS

October 9, 1978

U. S. Department of Health, Education, and Welfare
Office of Education
Bureau of Occupational and Adult Education

QUARTERLY REPORT

THE DEVELOPMENT AND TESTING OF A STATEWIDE

CURRICULUM MANAGEMENT SYSTEM FOR GEORGIA

VOCATIONAL EDUCATION PROGRAMS.

Period Covered:

This report covers the fourth quarter work for USOE Project Number C651 (July 1 - September 30, 1978).

Major Activities and Accomplishments:

The Hypothetical Curriculum Management Model

Project staff visited the state of Florida for the purpose of viewing that state's operational CMS. As a result of this observation, the project staff was able to further refine the CMS model by the adaptation of Florida's needs assessment procedure to Georgia's CMS.

Further work on the CMS model included additional detailing of several components including the field testing component and the evaluation components.

Instructor's Supervisor's Handbook

The following work has been done during this reporting period:

1. Transportation teacher's guide

   a. Volume I is complete except for final changes being added resulting from corrections.

   b. Volumes II and III are currently being written by instructors in the transportation cluster. Expected completion of these volumes should be about November 30, 1978. If time permits. each copy should be reviewed by each member of the appropriate committee and corrections made accordingly.

2. Construction

   a. The curriculum design of the existing construction cluster required various degrees of revision:

      -a carpentry supplement has been added to assign specific learning activities and projects to the various tasks of the cluster.

-specific activities are being added to the plumbing and electrical areas. These additions will be in the form of additional packages and needed changes in the existing units.

b. Volume I of the teacher's guide has been completed except for making additions and corrections resulting from changes in the packages.

c. Volumes II and III are being done by a committee of construction cluster teachers as the desired changes in the program are made.

3. Auto-Body Repair

Expected completion of the work on the auto-body repair teacher's guide is December, 1978.

a. Volume I is complete except for making the necessary corrections from final changes and the review of the materials by auto-body teachers.

b. Volume II is in the final stages of development.

c. Volume III, check points, has been completed and issued to auto-body workshop teachers. Changes and corrections which need to be made will be done by surveying and interviewing the teachers before volume III is completed.

4. Machine Shop

a. Volume III for the first quarter and second quarter has been completed.

Health Occupations

Initial drafts of 30 instructional units for Nursing Skills have been completed. These 30 units contain all the 153 tasks identified by V'TECS. The drafts have been distributed to schools of practical nursing to critique and field test.

Writing has begun on five additional units for the secondary clusters. These units will be complete by January 31. Additional writers have been added to the original 40. The new writers are writing the special units for the secondary clusters. Those clusters include housekeeping aide, and dietary aide. Hopefully, operating room technician will be included before January.

Problems--HEALTH OCCUPATIONS

As described in the above sections all units for practical nursing tasks have been written, however, these units are a very small part of the practical nursing curriculum. The Georgia State Board of Practical

Nursing designates the minimum number of classroom hours for each subject taught. The tasks identified by V'TECS are taught in the course entitled, Fundamentals of Nursing, and has been assigned a minimum of 110 classroom hours. The remainder of the curriculum is as follows:

Personal and Vocational Relationships	40 hours
Anatomy and Physiology	110 hours
Pharmacology	30 hours
Maternal and Child Care	50 hours
Pediatrics	20 hours
Nutrition	50 hours
Psychiatric Nursing	20 hours
Conditions of Illness	170 hours
	490 hours

To individualize a practical nurse program, learning packages must be developed for all areas, not just skills. Writing began for these units in June but more time has been required than that needed for writing nursing skill units. V'TECS analyzed the occupation of practical nursing, and the analysis was our basis for writing the instructional packages for skills. However, no analysis of the theoretical subjects could be found and the first task was to identify what the LPN needs to know.

Consensus of how much theory should be taught a practical nursing student could not be reached. Most instructors teach what they feel prospective employers expect of the new LPN, and these expectations vary in different areas of the state. The role of the LPN extends from that of Bedside Nurse to Team Leader. This lack of clarity in the job description of the practical nurse has caused curriculum development to be extremely difficult, if not impossible.

Despite the above problems, packages are being written which will provide instruction for entire practical nursing curriculum. Whether there will be time to critique or field test the units is doubtful at this point. The result may be unacceptance of the materials by instructors because the content may be inappropriate for all schools.

An additional factor which has become a problem because of too little time has been writing the curriculum for the secondary clusters. One year was not enough to write the practical nurse curriculum, and adding the secondary program too, created a monumental problem because of too little time.

Units are being written for all jobs identified by the Secondary Advisory Committee. However, there will be no way to verify that those units are appropriate because there will be no time for field testing.

Significant Findings and Events

None to report at this time other than that covered under Problems, Health Occupations.

Dissemination Activities

None to report at this time.

Data Collection

None to report at this time

Other Activities

None to report at this time.

Staff Utilization

No significant changes or additions from last report.

Activities Planned for the Next Reporting Period

1. The hypothetical CMS model and related literature will be prepared in rough draft and presented to project evaluation for comment.

2. PPBES concepts will be integrated into the supervisor's and instructor's handbooks.

3. Teacher's guides in transportation, construction, and auto-body will be completed except for editing and final typing.

4. Work will continue as planned in health occupations keeping in mind the problems identified in this report.

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